News about

B.F.Goodrich Chemical *raw materials*

HYCAR 1312,

a liquid nitrile polymer for

EASIER PROCESSING

Hycar 1312 improves flow, extrusion and calendering properties in nitrile rubber compounds. As a plasticizer both in nitrile rubber and vinyl plastisols, it is non-extractable, non-migrating and non-volatile.

Hycar 1312 provides nitrile rubber compounds with excellent building and knitting characteristics—it has good tack. Examples of applications where it is finding use are tank linings, building of rolls, and fabrication of hose.

A carboxy modified variation, Hycar 1300x2, possesses similar properties to 1312, but has the added advantage of cross-linking through the carboxyl groups by metallic oxides, epoxy resins, and other similar agents.

For information on either of these Hycar polymers, or other Hycar rubbers and latices, write Dept. CA-1, B.F.Goodrich Chemical Company, 3135 Euclid Avenue, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.

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E is for Excellent behavior

(even under severe stress and strain!)

Exceptionally good! That's the best way to describe Philblack E! This super abrasion furnace black adds extra durability, extra strength, extra long flex life to rubber compounds. It's recommended for such tough jobs as premium passenger car treads, heavy-duty, off-the-road tires . . . track-type tractor treads . . . industrial hoses and belts.

When you need a carbon black, be sure to determine which Philblack is best suited to your specific requirements. Your Phillips technical representative will be glad to advise. Call on him for expert assistance with rubber or carbon black problems. No obligation.

*A trademark

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I — **Philblack I, Intermediate Super Abrasion Furnace Black.** Superior abrasion. More tread miles at moderate cost.

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Rubber Age

COVERING THE MANUFACTURE OF RUBBER AND RUBBERLIKE PLASTICS PRODUCTS

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*Appears every other month

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Highlights Sidelights *of the News . . .*

February, 1959

Two symposia have been scheduled for the May 13-15 meeting of the Division of Rubber Chemistry, A.C.S., which will be held in Los Angeles . . . One of the symposia will be concerned with urethane foams and elastomers, while the other will cover the effect of ozone on rubber . . . In addition to the symposia, other interesting technical papers will be heard (page 816).

A Spanish rubber industry study team on a recent visit to the United States toured many domestic installations . . . The study was initiated in order to improve Spanish manufacturing techniques and to increase productivity in the industry . . . The team's interests embraced plant layout, production planning, manufacturing methods, modern machinery, management organization and other aspects of the rubber industry (page 824).

The Rubber Association of Canada has opposed tariff proposals on synthetic yarns and fabrics which have been made by the Primary Textile Institute . . . The Association notes that the problems of the tire fabrics industry are different than those facing other manufacturers . . . It is pointed out that tire fabrics are heavier than other synthetics and require more expensive capital equipment to make (page 836).

Great Britain's first venture into the bulk manufacture of general purpose synthetic rubber has come into being with the opening of the new 70,000 long ton plant at Hythe . . . The plant, occupying a 54-acre tract, is equipped to produce general purpose butadiene-styrene copolymers through a low temperature, cold emulsion polymerization reaction (page 818).

A nation-wide survey of 17 management consulting firms has revealed that wage incentive plans have increased productivity in 29 different industries by an average of some 63 per cent . . . The rubber industry showed a 64 per cent productivity increase and increased employee earnings of 26.5 per cent for 1958 . . . During that year unit costs in the rubber industry decreased by 31.5 per cent (page 823).

Copolymer Rubber and Chemical Corp. has begun operations at its new Research Center in Baton Rouge, La. . . . The building contains chemical, polymerization and instrument laboratories (page 821).

United Carbon Co. has begun construction of a sales technical service laboratory in Akron . . . the purpose of the new laboratory will be to assist the rubber industry in making most effective use of the company's products (page 831).

Fine-Particle Water-Fractionated Clays Reinforce Synthetic Polymers

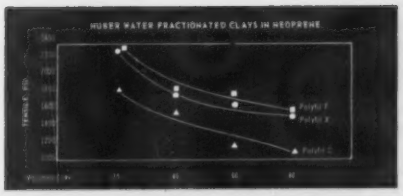
POLYFIL C

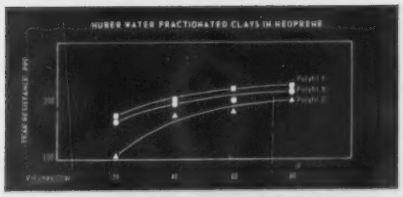
POLYFIL X

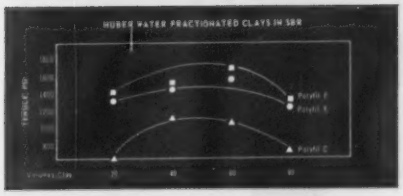
also available in spray-dried form as Polyfil XB

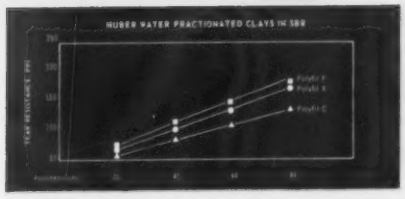
POLYFIL F

also available in spray-dried form as Polyfil FB









Huber's clay production methods have resulted in greatly improved grades of clay. The fine-particle water-fractionated clays are excellent for reinforcement where light, bright colors are needed. Known as Polyfils C, X and F (and as Polyfils XB and FB in spray-dried form), they may be the answer to your light color pigmentation problems.

A twelve-page Technical Service Bulletin is available. Ask for Bulletin R-614.

For Rubber Reinforcing Pigments, Think of HUBER

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CARBON BLACKS · CLAYS · RUBBER CHEMICALS

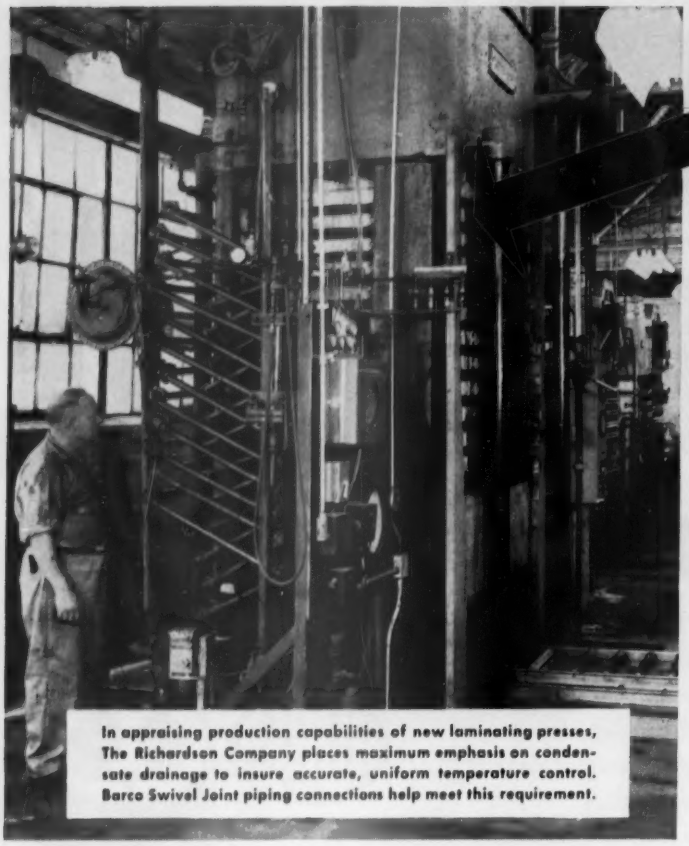
For Multiple Platen Laminating Presses

THE RICHARDSON COMPANY

MELROSE PARK, ILLINOIS

—Installs

BARCO *Self-Aligning* SWIVEL JOINTS



In appraising production capabilities of new laminating presses, The Richardson Company places maximum emphasis on condensate drainage to insure accurate, uniform temperature control. Barco Swivel Joint piping connections help meet this requirement.

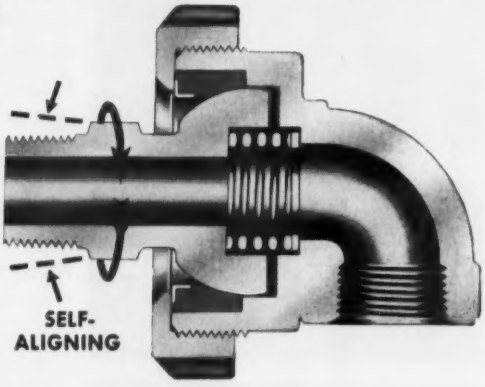
THE RICHARDSON COMPANY of Melrose Park, Illinois, has long been recognized as one of the nation's outstanding operators of molding and laminating press equipment. Utmost care is used in selection and installation of plant machinery. Particular attention is given to the installation of large multi-platen laminating presses. On these, Richardson production engineers wanted a neat, reliable arrangement for steam and water connections to closely spaced movable platens.

The answer (see photo at left) was to install 1" Barco Type S self-aligning, all-bronze Swivel Joints in metal "dog leg" piping. Each line is precisely positioned for perfect steam flow, with no "low spots" to trap condensate. Lines "nest" together when press is closed, yet move readily without interference when press opens. Operating experience has demonstrated that the joints stay tight without leakage and with no danger of blow-outs. When desired, the joints easily handle alternate flow of hot steam and cold water.

IT PAYS TO USE BARCO SWIVEL JOINTS!

ASK FOR CATALOG 265C

1. **IMPROVED SEAL**—Barco's new No. 11CTS gasket is amazingly long wearing! Does not bake hard. Ideal for steam and water service. Does not cause excess wear on other parts.
2. **LEAKPROOF, HOT OR COLD**—Joints stay tight regardless of pressure or temperature.
3. **SELF-ALIGNING**—10° side flexibility. This Barco feature saves piping time, cuts costs, and insures perfect performance.
4. **ENGINEERING RECOMMENDATIONS**—Send for a copy of Catalog No. 265C and installation drawing 10-52004.



BARCO MANUFACTURING CO.

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The Only Truly Complete Line of Flexible Ball, Swivel, Swing and Revolving Joints

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The most comprehensive warehouse service in the synthetic rubber industry is provided by TEXUS. It offers many outstanding features to help you plan production schedules . . . economically. These include:

- **truckload quantities at no premium**
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To make it possible for you to take full advantage of these service features, Texus is now operating complete SYNPOL warehouse operations at the following strategic locations:

Providence	**Chicago**
Edgewater, N. J.	**Los Angeles**
Akron	**Port Neches, Texas**

This warehouse service is just one more indication of TEXUS superiority as a source of supply.

For a wide variety of clear rubbers and ultradispersed carbonblack masterbatches, when you want them, and packaged to meet your needs—TURN TO TEXUS.

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General Offices and Plants: Port Neches, Tex. TEXUS Research Center: Parsippany, N. J.

REALLY NEW!

We invite you to investigate
the many important advantages of

Guardsman®

HYPALON*-Based Coatings

HYPALON*, the most exciting new film former of the day, makes possible finishes of unusual elasticity with excellent resistance to chemicals, humidity, fire, abrasion, fading and ozone cracking on rubber goods.

VERSATILE Hypalon*-based finishes may be applied by roller coat, doctor blade, spray, dip or silk screen . . . air dry or bake.

AS the largest producers of coatings based on Hypalon*, we invite you to investigate the marked advantages of its use on polyurethane, vinyl and rubber foams, rubber products, fabrics, metal, wood, concrete, plaster, hardboard and Mylar*

WRITE for more specific information as to how our Hypalon-based formulas can be adapted to meet your specified needs.*

* *Registered trademark of the E. I. DuPont Company*

Dept. HY-15

GRAND RAPIDS VARNISH CORPORATION

Grand Rapids, Michigan

Makers of the Famous ®Guardsman *Finish and* ®Guardsman *Cleaning Polish*

THE BETTER THE FINISH, THE BETTER THE BUY

Photo courtesy Beebe Rubber Company, Nashua, N. H.

Sure way to keep a step ahead

Keeping a step ahead, in any field, often boils down to having a bright idea. And that's what you'll find in the *RIPPLE® Sole. Its unusual comfort, resilience and grip are virtually assured through use of a high-quality rubber compound—one based on PLIOFLEX.

Why Plioflex? Its lightness of color, ease of processing, excellent uniformity, toughness and resiliency are the main reasons for its growing popularity—not only in soles, but in other quality rubber products which must be produced economically and efficiently.

If your product needs a lift, PLIOFLEX may be your answer. For detailed information on PLIOFLEX and other products in a complete line of synthetic rubbers and rubber chemicals—plus full technical assistance—write Goodyear, Chemical Division, Department B-9419, Akron 16, Ohio.

GOODYEAR

CHEMICAL DIVISION

Plioflex—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio *TM—Ripple Sole Corporation

Photo courtesy Rubbermaid, Inc., Wooster, Ohio

New way to lighten overloaded budgets

Eye-catching color is a "must" in the manufacture of many products, but particularly so in rubber housewares. Equally important in the highly competitive housewares market is the matter of cost. Color opens the sale, but real quality at reasonable cost will always close the sale.

Notice how the housewares above—made by an established leader in the field—blend colorful good looks with readily apparent value. A key reason for their sales success: they contain PLIOFLEX 1713, new oil-extended synthetic rubber by Goodyear.

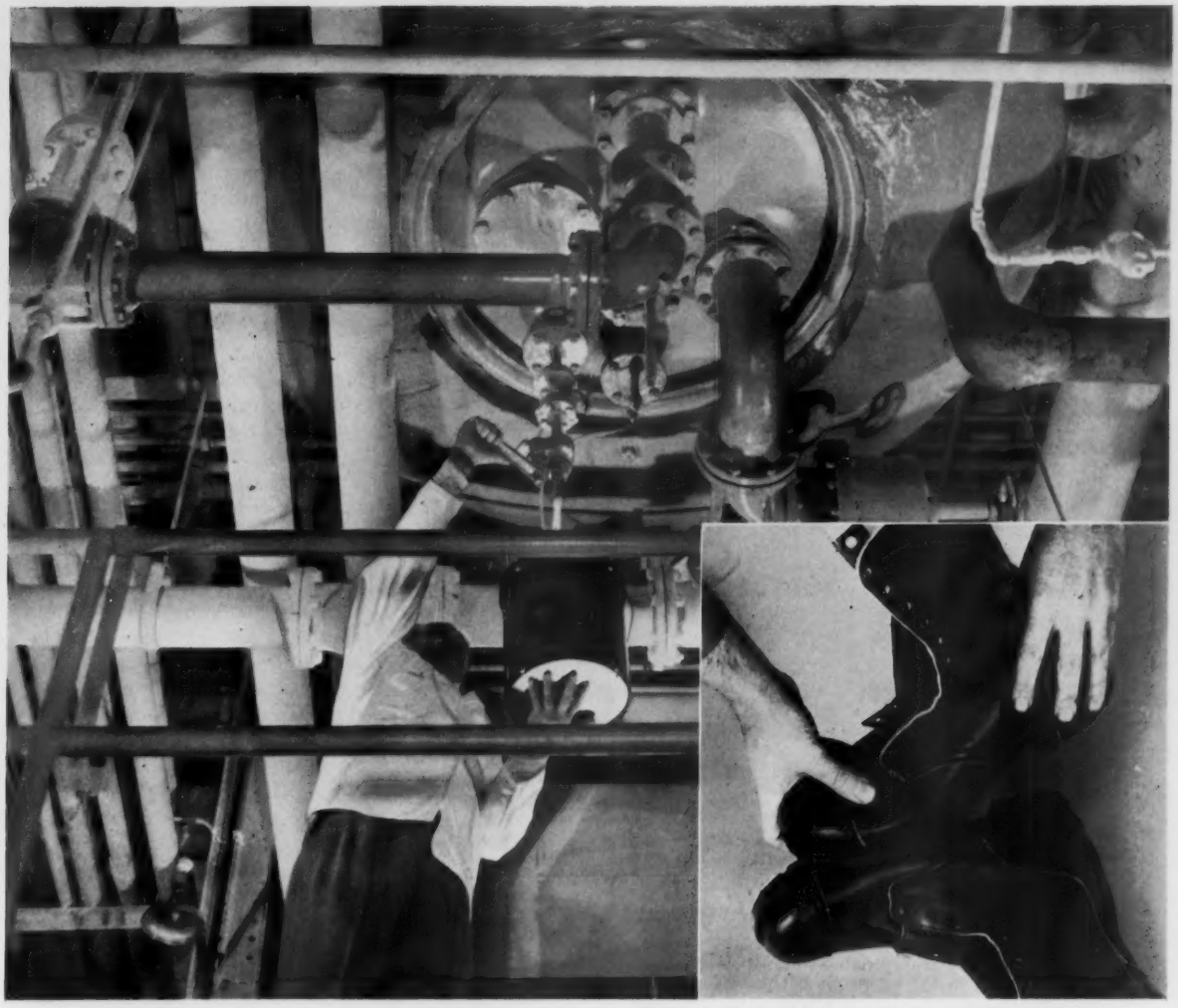
Used in combination with other rubbers, new PLIOFLEX 1713 was chosen by the firm for its excellent color characteristics, ease of processing, high uniformity and low odor level. What's more, it costs several cents less per pound than previously used polymers, yet can be compounded to maintain end product quality.

Perhaps new Plioflex 1713 can lighten your budget, too. For more information – plus latest *Tech Book Bulletins* on PLIOFLEX 1713 and a full line of synthetic rubbers and rubber chemicals—write Goodyear, Chemical Division, Dept. B-9419, Akron 16, Ohio.

GOODYEAR

CHEMICAL DIVISION

Plioflex–T.M. The Goodyear Tire & Rubber Company, Akron, Ohio



Cold facts about a new nitrile rubber

FACT I: It's called CHEMIGUM N600.

FACT II: CHEMIGUM N600 is a medium acrylonitrile content, "cold" rubber stabilized with a nondiscoloring antioxidant.

FACT III: CHEMIGUM N600 does an outstanding job of combining the easy processing of the low Mooney "hot" rubbers with the higher physical properties of the "cold" rubbers. It exhibits excellent resistance to oil, grease, fuel and water.

FACT IV: Testimony to the unusual properties of CHEMIGUM N600 can be found in its use for integrally molded boots (see inset above), an application requiring excellent physical properties and outstanding processability, particularly mold flow. This application also takes advantage of the scorch resistance possible with stocks based on N600, for CHEMIGUM allows a margin of safety unusual for this type of rubber.

FACT V: You can get full details—including the latest *Tech Book Bulletins*—on how CHEMIGUM N600 can improve your product simply by writing Goodyear, Chemical Division, Dept. B-9419, Akron 16, Ohio.

GOODYEAR

CHEMICAL DIVISION

Chemigum—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

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FOR DICING SHEET STOCK

The Famous CUMBERLAND

"Stair-Step" Dicer

Here at last is the answer to your problems of dicing rubber or vinyl sheet stock. Produces perfect cubes ranging in size from ⅛ to ½" by merely changing knives.

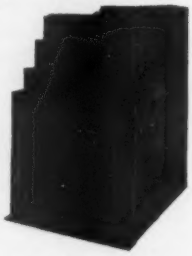
Comes in two sizes designed to handle sheets up to 7" or 14" in width. Other sizes made to order.

Input speeds range from 10 to 125 feet per min. depending on material and size of cube desired.

The CUMBERLAND Rotary Chopping and Dicing Machine

As a chopper, this machine efficiently cuts rubber and vinyl slabs into small pieces. Two sizes available to handle stock widths up to 14 or 24 inches.

As a dicer in modified form, handles principally vinyl sheet stock. A less expensive machine though less universal than the "Stair-Step" Dicer shown above.



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For Granulating Plastic . . .
Investigate Cumberland's complete line of granulating machines. Request Bulletin 590.

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DEPT. 3 · BOX 216 · PROVIDENCE · RHODE ISLAND
Builders of Better Machines for the Rubber and Plastics Industry

Overseas

Tokyo—The Japanese Geon Co. has announced that it will start the first synthetic rubber production plant in Japan this July. Trial production will begin in June at the company's plant a Kawasaki, near Tokyo, and full-scale production will be undertaken one month later. Initial output will be 230 tons a month.

New Delhi — India's Ministry of Industry has plans for a new synthetic rubber plant to be located at Bareilly in the north Indian state of Uttar Pradesh. This plant will be in full production by 1961 with a capacity of 20 to 30,000 long tons a year. The $30 million project will be open for foreign capital and two U. S. companies are said to be interested.

Kuala Lumpur—An expected agreement between the Malayan Plantation Industries Associated and the National Union of Plantation Workers has still not been signed at this writing. An earlier signing was called off at the last minute. The employers want the agreement to run for one year with a further six-month period in which terms would be reviewable. The unions ask for a 12-month agreement subject to a two-month termination notice.

Amsterdam — Royal Sulphuric Acid Works is planning to construct a plant for the manufacture of carbon black in the Netherlands. A new company will be formed, named Ketjen Carbon, Ltd. Royal Sulphuric Acid Works will have a majority of the shares and will manage the new company.

Singapore—Malayan rubber is not likely to be affected by the operation of the European Economic Community-Common Market according to government officials in Kuala Lumpur. Under the Common Market, six European countries will impose a small tariff on rubber. It is expected that the tariff will work out to about 1 per cent.

Jakarta—Three factories on a big plantation of the U. S. Rubber Co. in northern Sumatra have been burned down by Indonesian rebels. It is said that seven British-owned estates out of about fifty in Sumatra have been destroyed by the rebels who are fighting against President Sukarno's policy of "guided democracy."

Rio de Janeiro—The Brazilian Coffee Institute has signed an agreement with the Secretariat of the State of Sao Paulo whereby 10.5 million rubber trees will be planted on old, uneconomic coffee lands in Sao Paulo. The agreement covers a six-year period at the end of which time Sao Paulo will be in a position to produce about 30,000 long tons of rubber a year.

Get all six with Marmix!

1. Less stretch and curl
2. Firmer body and hand
3. Stiffness control
4. Excellent tuft lock
5. Improved age-resistance
6. Lower material cost

In terms of compounding, application and performance, you enjoy realistic rug backing benefits with a MARMIX Resin Latex. MARMIX offers you two distinctive Latices—both offering dependable compounding behavior and important reinforcing advantages. To make your rug backing process easier and more economical, investigate . . .

MARMIX 7345 . . .
HIGH-STYRENE RESIN LATEX

MARMIX 4950 . . .
TERPOLYMER RESIN LATEX

WRITE TODAY FOR MARMIX SAMPLES

PACESETTER IN
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CANADA: Dillons Chemical Co. Ltd., Montreal & Toronto
EXPORT: British Anchor Chemical Corp., New York

BW
Marbon

Here's how UOP 88® and ...to protect your rubber

What you need to know about antiozonants today

When UOP 88 or UOP 288 is compounded into your rubber products, deterioration of the polymer by exposure to ozone is prevented by action of the UOP chemical antiozonant which continually migrates to the surface of the rubber article and there acts as a sacrificial ozone scavenger.

That's nutshelling it for you. Behind this simplification of how UOP 88 and 288 work is a vast network of factors to be taken into consideration. How long and how well the antiozonants will work for you depend on a knowledge of the differences in antiozonants and the factors involved in compounding.

Knowing the difference

Antiozonants vary widely in type and composition. One material may give quite satisfactory protection under static conditions but fail miserably under even modest flexing. Another will provide mediocre protection in static or dynamic service. UOP 88 and 288 however provide excellent ozone protection to rubber goods in storage and in use.

Proper application is almost as important as antiozonant selection. A windshield wiper blade formulation, tire compound or gasketing recipe will differ—sometimes widely—in composition; the service conditions of the finished article are equally diverse. In making recommendations for ozone protection all these factors must be evaluated. The conditions of use and service are of utmost importance in selecting the amount and means of antiozonant protection.

At Universal Oil Products Company some of the country's most able research scientists and technicians work constantly testing and improving the UOP family of antiozonants.

What influences effectiveness

Effectiveness of antiozonant compounds may be influenced by these major factors:

1. Type of polymer, natural or synthetic
2. Curing system used
3. Reinforcing agent used
4. Concentration of the compounding ingredients, including the antiozonant
5. Conditions under which the product is to be used, including:
   a. type of stress encountered (fixed or intermittent)
   b. ozone concentration
   c. temperatures

When the product is to be vulcanized, the choice of curing system is the most important single factor in obtaining maximum antiozonant performance. The formulation being used must be suited to the curing system or much of the antiozonant's protective action will be lost in vulcanization.

The type and concentration of carbon black used as a reinforcing agent also plays an important part in retention of antiozonant efficiency through the vulcanization phase.

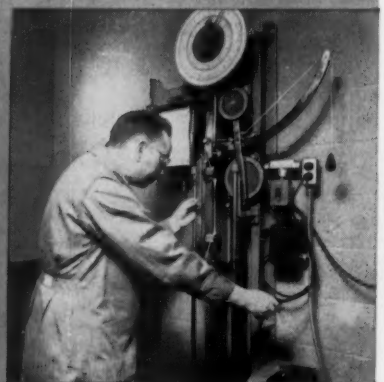
The concentration levels of the antiozonant must be related to other ingredients of the compounding recipe and to exposure conditions. Variations in type or concentration of ingredients reduce or enhance the final, lasting effectiveness of the antiozonant.

So you already use an antiozonant

Like most rubber goods manufacturers, you probably include some

Every day we test a number of rubber recipes. Exaggerated conditions of stress and ozone concentration in the oven assure complete protection under any normal conditions.

In the Universal rubber laboratory, a rubber mill is used to incorporate experimental UOP antiozonants in various rubber polymers.



The Scott Tester is used to measure physical properties of an experimental vulcanizate.

288® work products

kind of antiozonant compound in your product formula. What you may not know, however, is that the ozone damage problem is becoming progressively more acute and not all antiozonant compounds can cope with the increasing ozone levels. What served as effective antiozonant protection even a few years ago is inadequate today. Reported instances of deterioration of rubber goods due to ozone attack are often quite dramatic. In the Los Angeles area, where the ozone concentration is high, an unprotected rubber article may actually show ozone damage in a few days. In other large cities where ozone levels are not so high, ordinary base stocks may crack in a year or less even under static conditions. • UOP researchers have worked unceasingly and successfully to keep UOP 88 and UOP 288 compounds up to the demand placed on the antiozonant for utmost protection against this spiralling ozone load.

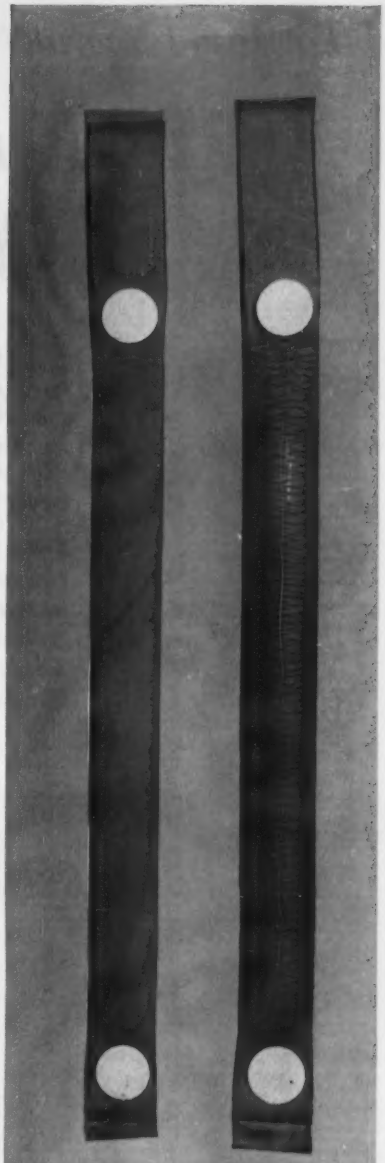
Here's proof

The UOP research laboratories are the scene of a daily battle against ozone. Through continuous research and arduous testing of thousands of antiozonant formulations in a variety of base stocks, you may be assured of absolute protection of your products when you use UOP 88 or UOP 288. In addition, many manufacturers have tested UOP antiozonants in their own laboratories and in use, have proved them to be superior. One of our tire customers recently reported that in a test of UOP 88 in their base stock, the UOP antiozonant afforded complete protection for 230 hours of exposure under fixed conditions of strain at 50 pphm ozone . . . much greater strain and ozone concentration than the tire would ever be subjected to in normal use. Comparatively, another antiozonant, used in the same recipe, failed and the tire cracked after only 30 hours of exposure. As a further basis of comparison, the unprotected base stock cracked in 5 hours.

How about your product?

You will get surer, more lasting protection of your rubber products with UOP 88 or UOP 288. For one little penny per pound of base stock these UOP antiozonants will perform for years to prevent ozone cracking, even under severe atmospheric exposure.

All UOP facilities and technical personnel are at your disposal for counseling on your particular antiozonant needs. A phone call, letter or wire will put them to work for you right away.



Rubber Strip Tests Show Effectiveness of UOP Antiozonants

The two rubber strips above were inserted in an ozone cabinet under identical, controlled conditions. The rubber in the sample shown on the right did not contain an antiozonant and reveals marked ozone damage. The SBR sample on the left contains two parts phr of a UOP antiozonant and reveals no ozone cracking after equal exposure.

UOP 88® and 288®

RUBBER ANTIOZONANTS

UNIVERSAL OIL PRODUCTS COMPANY

30 Algonquin Road, Des Plaines, Illinois, U.S.A.

Taylor-Emmett Timer insures

REPEATABILITY OF CYCLES

Type E364 ROBOTRON* Timer—a flexible, quickly set controller for the precise operation of a Hydraulic Press where bumping and timing control is required. Extremely low load and high capacity insure long life and dependability.

CHECK THESE FEATURES:
Completely Packaged Unit • Airtight Enclosure • Rapid Setup • Cycles Quickly Changed • Extended Rangeability • Enclosed Electrical Component • Plug-in Elements • Etched Circuits

Taylor-Emmett **NEV-R-GRIND*** *Valves mean* **NO WARPING... NO FOULING**

Three-Way (E380) and Two-Way (E370) Valves are fully balanced, cylinder operated, compact and have excellent capacity. Available in 3500 and 6000 psi. body ratings. Both are normally operated at 35 to 50 psi. air pressure.
Fully balanced design permits application of pressure to any port connection. Type E370 is available either normally open, or normally closed. Sizes 1" to 4".

Type D532 Cylinder-Operated Valve is half the size of conventional valves, has one quarter the parts. Extremely compact and maintenance-free. 750 psi. Sizes ½" to 2½". Normally open: normally closed: 3-way semi-balanced.

Call your Taylor Field Engineer, or write Taylor-Emmett Controls, Inc., Akron, Ohio, or Taylor Instrument Companies, Rochester, New York.

*Trade-Mark

Taylor-Emmett Controls, Inc.
A SUBSIDIARY OF *Taylor Instrument Companies*

News in Brief

► An eight-page industrial catalog of rubberized abrasives for deburring, smoothing and polishing is now available on request from the Cratex Manufacturing Co., Burlingame, Calif.

► B. F. Goodrich Chemical Co., Cleveland, Ohio, has issued a Hycar Latex newsletter that is devoted to the use of Hycar latices as grease-proof coatings on papers and as saturants for paper.

► Catalog No. NI-103, published by the Devcon Corp., Danvers, Mass., describes "Plastic Steel" and other Devcon products for the plastics, metal working and other industries.

► B. F. Goodrich Industrial Products Co., Akron, Ohio, has published a new eight-page catalog on its line of industrial protective clothing.

► Three new "Tech Book Facts" bulletins concerning the compounding and processing of Pliovic vinyl resins have been published by the Chemical Division of the Goodyear Tire & Rubber Co., Akron, Ohio. TBF 58-94, Pliovic AO; TBF 58-97, Pliovic AO and Pliovic S50 in Plastisols, and TBF 58-115, Pliovic S70 are the new bulletins.

► Lighting Division of Safety Industries, Inc., P.O. Box 70, Milford, Conn., has issued a folder that describes Infrared oven sections of the R-130 series, which can be assembled to meet batch-type requirements for baking, drying and product heating.

► Enjay Co., Inc., New York, N. Y., has published the second section to Volume II of the Enjay Butyl Manual. This section classifies by Shore "A" hardness many of the compounds contained in the first section of Volume II.

► Technical Bulletin No. 1, an eight-page brochure on injection molding and extrusion of "Moplen" polypropylene, has been prepared by Chemore Corp., general representative in the United States and Canada for Montecatini Co., Milan, Italy.

► The "Silco-Flex" impervious insulation system for motor and generator stator coils is described in a new bulletin released by Allis-Chalmers Manufacturing Co., Milwaukee, Wisc.

► American Rayon Institute, Inc., has announced the opening of a new office in the First National Tower Building, Akron, Ohio.

► Monroe Co., Inc., has issued a new brochure on "Vulca-Dek", a new re-roofing system that cuts application costs as much as 55 per cent.

MONSANTO RUBBER CHEMICALS ANSWER ANOTHER IMPORTANT COMPOUNDING QUESTION:

What delayed-action sulfenamide accelerators are my easiest-to-use, surest protection against scorch?

ANSWER:

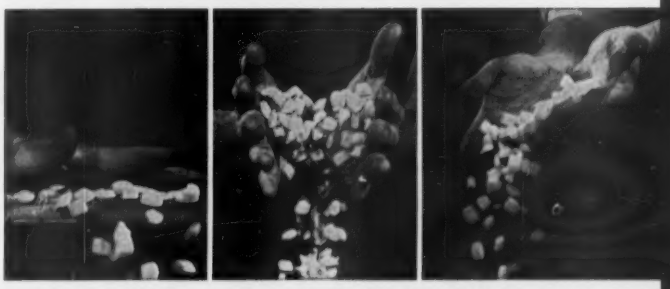
New Santocure and Santocure NS "BRIQUETTES"

ACTUAL SIZE

Look how new BRIQUETTES of Santocure and Santocure NS give you more plant-handling ease and convenience. Free-flowing BRIQUETTES won't pack, "bridge" and surge like dry powders —are ideal for automatic weighing or scoop handling. No weighing losses. No rolling! No sticking to the throat or ram of the banbury. Now, with maximum ease of weighing and handling, you can be sure of the delayed-action, safer cures that the Santocures are known to give.

Still the most popular and lowest cost, Santocure was the first uniformly successful sulfenamide accelerator. Powerful Santocure NS gives even greater safety from scorch—up to 10% less accelerator may be used for similar fast, flat curing rates.

Whenever scorch problems threaten . . . from more rapid processing, higher temperatures, thicker sections, greater activation from reinforcing furnace blacks . . . try Santocure or Santocure NS BRIQUETTES. Write for sample and technical help in your application.



WON'T CAKE! WON'T BRIDGE! ALWAYS FLOW FREELY, BUT WON'T ROLL

Santocure: Monsanto T. M. Reg. U.S. Pat. Off.

LET MONSANTO RUBBER CHEMICALS ANSWER YOUR NEXT COMPOUNDING QUESTION

Jot it down on the nearest sheet of paper and send it in with your return address. No obligation—no salesman will call (unless you so request). To help you solve specific problems, Monsanto draws from basic knowledge of more than 85 rubber chemicals and over 18,000 compounding studies. Write, today.

FOR SAMPLE, USE HANDY COUPON

Monsanto

Monsanto Chemical Company
Rubber Chemicals Department
Akron 11, Ohio

Please send me a sample of new

☐ Santocure BRIQUETTES ☐ Santocure NS BRIQUETTES

Name .....

Company .....

Address .....

City ..... Zone ..... State .....

DANGERS of launching a NEW PRODUCT

Snell Research can help overcome them

Here's how, in some typical case histories of Snell clients:

Product Research and Development—A few years ago Snell was retained to develop new products, applications, and markets for sugar. Extensive research and development work by Snell resulted in the creation of a new synthetic detergent—based on *sugar!*

Product Application—A Snell client in the paper industry, for whom we had developed a fine additive, wanted to explore uses in other fields. Unfortunately, their highly qualified staff's experience was limited to the one field. Snell, with experts in practically every product field, found the new product has potentialities as both a good emulsifier and a paint plasticizer. Only the very largest manufacturing companies can duplicate the breadth of experience and background the Snell "brain-trust" of technical experts can offer you!

Product Improvement—One Snell client found their product, an adhesive bandage, slipping in quality. Tape was going gooey in storage on druggists' shelves. Snell research helped this client bring his product quality up to equal the best on the market, and retain his share of sales.

Product Evaluation—A Snell brewery client wanted to expand production and take advantage of a more efficient production technique but feared the taste of the beer might suffer. Snell food technologists, taste panels, and engineers checked the new process and hundreds of samples of beer made under new and old systems, recommended the switch to the more profitable modern process. The change went unnoticed by the customers, and sales continued to climb.

Market Research—A Snell client with a waste product had briefly considered building a plant to use it to manufacture another product; but had given up after their own brief survey showed the new product to be already overproduced. When they consulted Snell for checking, however, Snell predicted there would be a shortage within three years. The client waited two years, built the plant—and now has a profitable new product instead of a waste!

Toxicology—One of the largest frozen food companies began getting complaints on the flavor of one of their green vegetables. Since hundreds of thousands of dollars were at stake, they consulted Snell to find out what was wrong. Snell by analyzing tests, and checking on the farm, was able to prove that the taste—actually toxic—was due to a new type of insecticide sprayed on the fields hundreds of yards away on a windy day long before the harvest!

Engineering—A large midwestern firm desired to produce its own brand of instant coffee, to possess outstanding flavor, body, and bouquet. They engaged Snell to handle all details, from design to engineering, to supervision of actual process startup. The fine qualities "built into" this resultant product made it such a success that Snell was commissioned to enlarge the plant, which has recently gone into production.

What's Your Product Problem?—Whatever it is, and whatever your product field—chemicals, chemical specialties, personal products, pulp and paper, protective coatings, plastics, textiles, foods, petroleum, rubber—Snell has men who "know the score" in that field, and who can work with you creatively and profitably in developing, producing, protecting, and marketing new ideas. This broad experience can be decisive in protecting not only your ideas, but also the thousands of dollars you spend developing them. And the cost of Snell service is less than you might imagine! Half the jobs we do cost less than $1000!

SEND FOR FREE BOOKLET

Our brochure, "How to Develop Successful New Products," tells the whole Snell story. Why not send for it today? No obligation, of course. Foster D. Snell, Inc., Dept. R-2, 29 West 15th Street, N. Y. 11, N. Y.

FDS SNELL

New York, N. Y.
Baltimore, Md.
Bainbridge, N. Y.
Worcester, Mass.

► Sprout-Waldron & Co., Inc., Muncy, Penna., has issued Bulletin 202 that explains the operation "Rotaircool," a compact rotary pellet cooler and dryer with a built-in pneumatic conveying system.

► Burns & Roe, Inc., New York, N. Y., has published a 6-page folder describing the firm's services to the chemical industry, which include all phases of process, equipment and building design.

► Mechanical Goods Division of U. S. Rubber Co., Passaic, N. J., is offering a pocket-sized conveyor belt trouble shooter that lists the twenty headaches most frequently suffered by conveyor belt users and specific cures for those headaches.

► Four methods commonly used by leading industrial plants to remove paint are described in detail in a new booklet published by Oakite Products, Inc., 19 Rector St., New York, N. Y.

► A nomograph used to determine the quantity of silicone rubber compound required for production of either industrial tubing or military hot air ducting is available from Silicones Division, Union Carbide Corp., New York, N. Y.

► Hercules Powder Co., Wilmington, Del., has announced its third annual program of unrestricted grants-in-aid, by awarding approximately $100,000 to 24 American colleges and universities.

► Technical Service Laboratory Bulletin No. GD 21, published by Godfrey L. Cabot, Inc., Cambridge, Mass., gives the results of a test using "Vulcan 3" and "Vulcan 6" in natural rubber and synthetic rubber blends for truck tire treads.

► Precision finishing by the wet blasting method is the subject of a new bulletin issued by the Techline Division of Wheelabrator Corp., Vicksburg, Mich.

► Bulletin No. PF 1300, an eight-page folder describing Hard Rubber Pipe Fittings and Valves, has been issued by the Luzerne Rubber Co., Trenton, N. J.

► An illustrated 37 x 21-inch bulletin board map of the United States showing the truck transportation story has been produced for school use by the Automobile Manufacturers Association.

► Colonial Rubber Co., Ravenna, Ohio, has released data bulletins completely describing compound properties of three formulations of "Silicol" silicone rubber that are recommended to be used for general purposes such as seals, gaskets and special shapes for industrial use.

How to squeeze out the last ounce of profit

Consider the cost savings that are often possible with CUMAR® Resins. Because they improve mold release and extrusion properties, production rates go up. Because they permit high loading, materials costs go down.

Cost savings flow naturally from the use of "CUMAR" Resins as a processing aid, softener or extender. Rubber compounders use it to attain high electrical resistance in insulations . . . a "leatherizing" effect in soles and heels . . . attractive sheen for molded rubber housewares.

Here are some other desirable properties which these paracoumarone-indene resins impart to practically all rubber compounds.

- High plasticity with lower modulus
- Improved processing, calendering and tubing properties
- Permanent tackiness in uncured stocks
- Improved mold flow and better finish
- High loading possible without degradation
- Low scorching tendencies
- Good storage properties

In addition to "CUMAR" Resins, we have developed a number of hydrocarbons and oils for use in rubber compounding. You name the specific properties you want in your stock. Our technical staff will recommend proper ingredients. For samples of products, or technical assistance, call our local representative—or contact us direct.

PLASTICS AND COAL CHEMICALS DIVISION
Formerly part of the Barrett Division
40 Rector Street, New York 6, N. Y.

Allied Chemical

NEW POLYSAR S-630

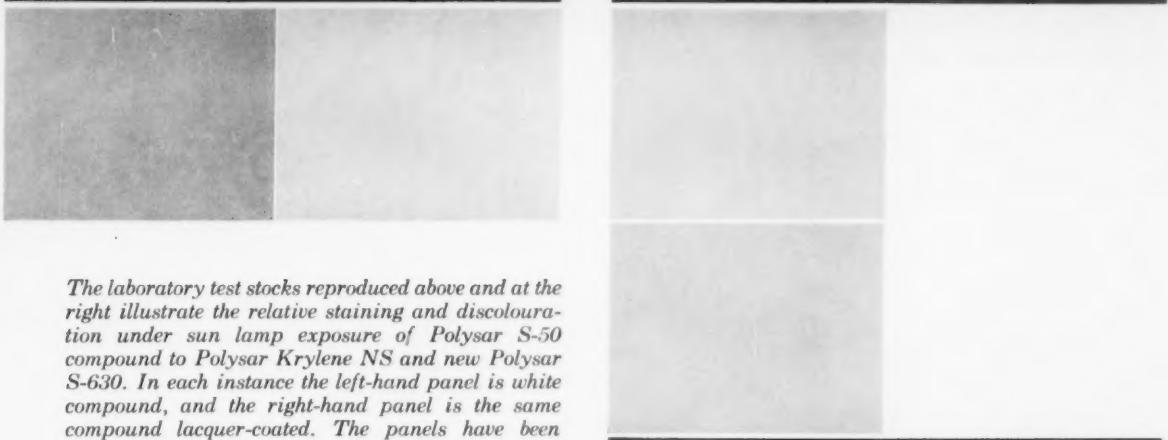
An easy-processing "hot" rubber that won't stain – won't discolour!

POLYMER CORPORATION LIMITED
POLYSAR
SARNIA CANADA
*Registered trade mark

SYNTHETIC RUBBERS

Polysar S-50

Polysar S-630



The laboratory test stocks reproduced above and at the right illustrate the relative staining and discolouration under sun lamp exposure of Polysar S-50 compound to Polysar Krylene NS and new Polysar S-630. In each instance the left-hand panel is white compound, and the right-hand panel is the same compound lacquer-coated. The panels have been exposed under two 275-watt reflector sun lamps for 24 hours.

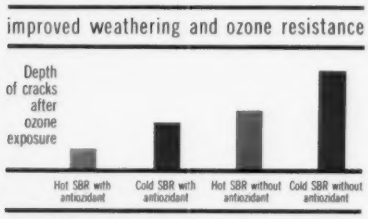
Polysar Krylene NS

NOW... all the inherent advantages of "hot" SBR *Plus light colour, non-staining, non-discolouring*

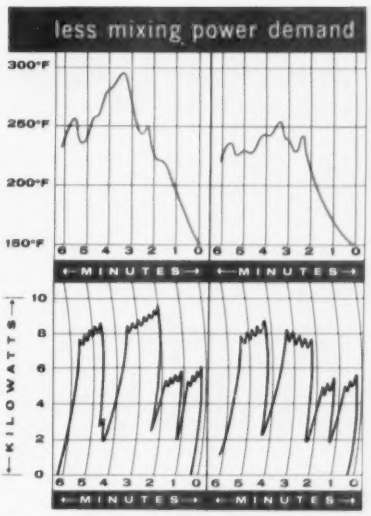
With the introduction of Polysar S-630, Polymer now brings you the easy processing, weathering resistance qualities of "hot" rubber plus new lightness of colour and improved non-staining, non-discolouring properties.

This new Polysar rubber thus brings substantial improvements to white or coloured tire sidewalls, non-staining carcass stocks for passenger tires and beadwire covering, conveyor and transmission belt carcasses; sponge products, such as rug underlay and weatherstrips; floor tiles; battery boxes and other ebonites; vacuum-moulded automobile floor mats, and cements.

In the manufacture of high impact polystyrene, the same degree of improvement in impact resistance given by cold rubber is attainable with smaller quantities of Polysar S-630. In almost every product where colour stability is important, this new rubber brings new advantages.


improved weathering and ozone resistance
Depth of cracks after ozone exposure
Hot SBR with antiozidant
Cold SBR with antiozidant
Hot SBR without antiozidant
Cold SBR without antiozidant

The chart above shows the marked improvement in weathering and ozone resistance achieved by new Polysar S-630. The depth of cracks after ozone exposure in "hot" SBR compounds without antiozidant is almost two-thirds less than in similar compounds based on cold SBR. When both rubbers are protected with an antiozidant the depth of cracks developed in the "hot" SBR is less than half the depth of those recorded in cold SBR.



The top chart records temperatures of cold and hot SBR compounds during Banbury mixing. The lower chart shows the corresponding power demands. Note the substantially lower temperatures and lower power demands of the Polysar S-630 compound.

Polysar S-630 is the subject of our Polysar Technical Report No. 7:12A. Write for a copy.

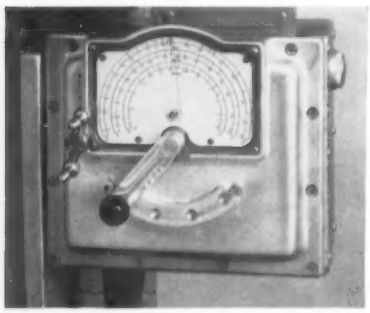
POLYMER CORPORATION LIMITED • SARNIA • CANADA

Where speed and accuracy are essential...

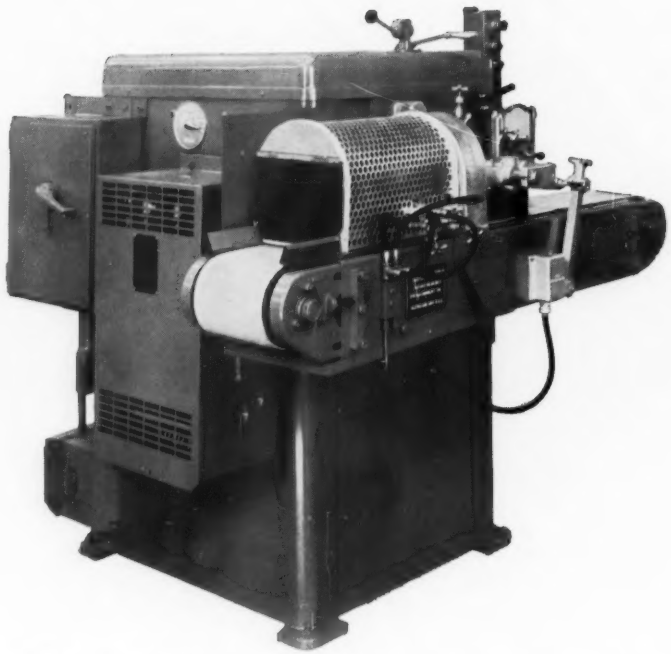
Wink® High Speed Automatic Cutting Machines give faster production, boost profits!

WINK high speed Cutters were developed to provide exacting accuracy, tremendous speed and controlled feed to the cutting of a wide variety of materials. These include Rubber (both raw and cured), Plastics, Impregnated Fabrics, Reinforced Hose, Natural and Synthetic Fibres, Ceramics, Candy and other materials. These materials may be cut in diameters up to 3 inches—hot or cold, wet or dry—*without distortion or collapse.*

WINK Cutters are especially suited to the precise cutting to length of extruded materials—may be easily incorporated in a completely automated extrusion line. Cutting action may be continuous or intermittent . . . in lengths up to 60 feet (or more if desired). Materials may be sliced to a mere 1/10-inch length of small diameter stock. Even solid, uncured rubber 2 inches in diameter can be cut to 1/8-inch lengths at rates up to 1000 pieces per minute.



This newly-designed, finger tip controlled metering unit provides three intermittent cutting ranges —enabling selection of lengths from 1/2-inch to 60 feet. Scale is graduated in feet and inches which makes for precise, rapid setup—simple to operate. (Patent Pending)



Model M-420 Universal *is a completely automatic machine for both continuous and intermittent cutting. The built-in metering conveyor elements transport the uncut stock to the knives, precisely measure the length of cut and move the cut stock away from the blades. Wink actually measures while it cuts from four points simultaneously. It does not depend upon timing or synchronization with another unit or machine—does not cut against a dead element but against another live knife.*

WINK Cutting Machines Reduce Production Costs 7 ways

1. Speeds up to 1500 per minute without distortion or collapse (3000 or more on some applications);

2. Setup Time in minutes (average time is 5 minutes per job);

3. Scrap reduced as much as 90% over traditinal methods; *No* recurrent loss of end stock; Material is saved by cutting *to exact dimensions;*

4. Secondary operations often eliminated;

5. WINK cuts "on the fly"—right off the conveyor belt, (within inches of the extruder plate if desired);

6. Cuts Hot, Cold, Wet, Dry or Sticky Materials exactly—*without distortion;*

7. WINK cuts even delicate, uncured shapes without collapsing—eliminates filling or internal lubrication of materials.

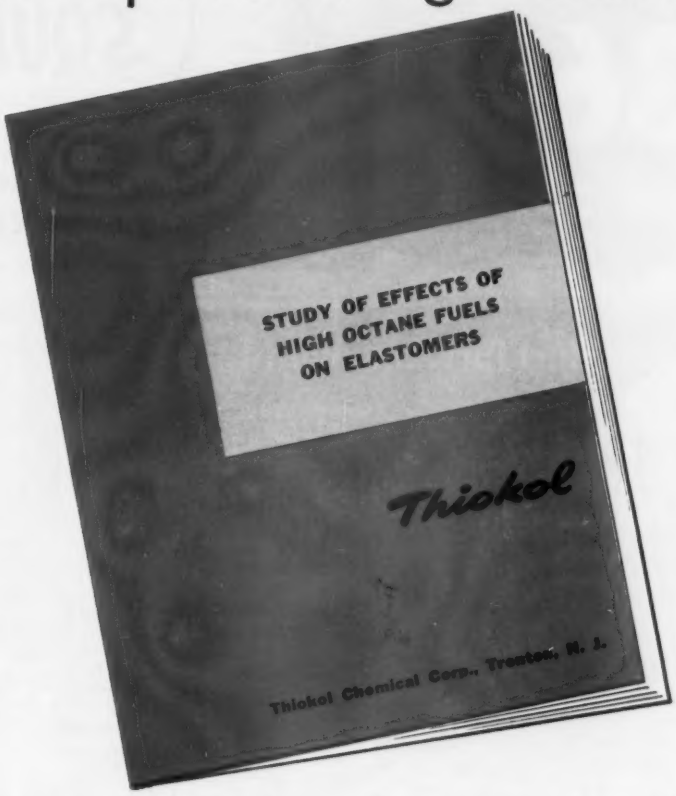
Remember, Wink Cutters are available on Lease, Lease-Purchase or Time Payment plans to help cut your extruded material faster, more accurately and without any distortion. They're designed by a highly skilled engineering staff and produced in one of today's most modern manufacturing plants using the finest in production, tooling and quality control methods.

Write today for your free copy of Wink Bulletin W-100. It contains engineering information on the complete Wink Cutter line.

MOTCH AND MERRYWEATHER

WINK CUTTER DIVISION
1250 E. 222nd Street
Cleveland 17, Ohio

Research Underscores Need of New Approach to Manufacture of Hose and Other Rubber Equipment Exposed to High Octane Gasoline



Laboratory study shows dangerous degradation of present elastomers under new aromatic fuels

The trend to higher octane gasolines dictates a re-evaluation of rubber requirements – in the petroleum field – at refinery, transportation and service station levels. Exhaustive tests by THIOKOL point up the need.

Six different types of synthetic rubber now widely used – including THIOKOL ST and FA polysulfide crudes – were used for the tests. Immersed in fuels of varying aromatic content, from 25% to 100%, the elastomers were measured for volume swell, tensile strength, and low temperature properties. Most synthetics showed a marked reduction in physical properties and serviceability, while the THIOKOL crudes satisfactorily resisted "high octane rot."

The detailed results of this THIOKOL study hold great significance for suppliers in the rubber industry. Coupon will bring you a copy of the complete report.

FOR MORE INFORMATION:
Mail coupon to Dept. 11, Thiokol Chemical Corp., 780 N. Clinton Ave., Trenton, N. J. In Canada: Naugatuck Chemicals Division, Dominion Rubber Co., Elmira, Ontario.

Gentlemen: Please send me a complete report of your aromatic fuel study.

Firm_____

Street_____

City_____ State_____

Your Name_____

Thiokol®
CHEMICAL CORPORATION

®Registered trademark of Thiokol Chemical Corp. for its liquid polymers, synthetic rubbers, rocket propellants, plasticizers and other chemical products.

AGENT 36
SILICONE SQUAD
HOW I TRAIN ADVICE SQUADS
FROM THE OFFICIAL FILES OF DOW CORNING
Burt Dirt, Enemy-at-Large
"OUR CHALK-TALC TODAY IS "BEFORE AND AFTER" OR "HOW SILICONES WORK AND PAY."
"THEY SAY SILICONES COME FROM QUARTZ."
VISUAL AIDS MOVIE
"THE HOUR OF PARTING
with MISS ZITA ZOOM
Selected shorts
"QUARTS? TAKE ME TO YOUR LITRE!"
1
TIPTOE THRU THE TALCUM
JOE STORMIN Foreman
"IN THIS PLANT YOU SEE MESS, WASTE MAINTENANCE, AND... WORST OF ALL.. MOLD DOWNTIME. THAT'S BECAUSE THEY DON'T USE SILICONES FOR MOLD RELEASE."
"IT'S DIRT!"
"IT'S A BOG!"
"IT'S A DIRT BOG!"
2

"HERE'S A PLANT THAT USES SILICONE PARTING AGENTS. NOTE THAT THERE'S NO BUILD-UP IN MOLDS, THEREFORE, VIRTUALLY NO MOLD CLEANING. MOLD DOWNTIME IS CUT TO NIL. SCRAP GOES DOWN. BETTER PRODUCTS RESULT. MONEY IS SAVED! VERY LITTLE TALC IS USED, THE PLANT STAYS CLEANER-SO EVERYONE'S HAPPIER!"
AGENT 36
DOW CORNING 36
SMACK
CURSES!
"THIS PLACE IS PEACHY CLEAN, GENE!"
"SILICONES ARE BREAKING UP THAT MOLD GANG OF GRIME."
3

"YOU'VE SEEN DIRT CLOG A PLANT'S PRODUCTION, AND HOW SILICONE RELEASE AGENTS ELIMINATE THE MESS. BACK IN CLASS, I'LL SHOW YOU MORE FACTS..."
Rubberneck '36'
DC-36
4

"EFFECTIVENESS OF DOW CORNING SILICONE EMULSIONS HAS MADE THEIR USE MORE WIDESPREAD, INCREASED DEMAND AND PRODUCTION. RESULT-PRICE HAS DROPPED STEADILY SINCE THEY WERE INTRODUCED. THAT MEANS EVEN MORE SAVINGS FOR THE MOLDER."
Price Trend: DOW CORNING EMULSIONS VS INDUSTRIAL CHEMICALS
(INDUSTRIAL CHEMICALS)
(DOW CORNING EMULSIONS)
YEARS
AGENT 36
5

"NOW A WORD FROM A SLICK OPERATOR, SERGEANT SYL-OFF."
"ALWAYS REMEMBER - SYL-OFF IS THE PERFECT RELEASE COATING FOR BAGS OR UNIT CONTAINERS. NOTHING STICKS TO A SYL-OFF PAPER COATING. THAT'S WHY P.A.'S SPECIFY CONTAINERS COATED WITH SYL-OFF FOR CRUDE AND OTHER STICKERS."
AGENT 36
6

first in silicones
Dow Corning CORPORATION
MIDLAND, MICHIGAN
ATLANTA BOSTON CHICAGO CLEVELAND DALLAS
LOS ANGELES NEW YORK WASHINGTON, D.C.

COMING EVENTS

Feb. 27. Quebec Rubber & Plastics Group, Ladies Night Dance, Victoria Hall, Montreal, Canada.

March 3. Buffalo Rubber Group Spring meeting, Hotel Westbrook, Buffalo, N. Y.

March 13. Chicago Rubber Group, Furniture Club, Chicago, Ill.

March 19. Quebec Rubber & Plastics Group, Reclaimed Rubber Panel Discussion, Montreal, Canada.

March 20. New York Rubber Group, Technical Meeting, Henry Hudson Hotel, New York, N. Y.

April 3. Akron Rubber Group, Sheraton Hotel, Akron, Ohio.

April 5-10. American Chemical Society, 135th National Meeting, Boston, Mass.

April 6. Washington Rubber Group, Spring Meeting.

April 6-8. Building Research Institute, 8th Annual Meeting, Penn-Sheraton Hotel, Pittsburgh, Penna.

April 16. Fort Wayne Rubber & Plastics Group, Spring Meeting, Van Orman Hotel, Fort Wayne, Ind.

April 16. Quebec Rubber & Plastics Group, "Rubber & Plastics Extrusion," Montreal, Canada.

April 17. Detroit Rubber and Plastics Group, Spring Meeting, Detroit Leland Hotel, Detroit, Mich.

April 24. Chicago Rubber Group, Furniture Club, Chicago, Ill.

May 1. Joint International Meeting, Buffalo Rubber Group-Ontario Rubber Section, C.I.C., Hotel Sheraton-Brock, Niagara Falls, Ont.

May 1. Philadelphia Rubber Group, Poor Richard Club, Philadelphia, Penna.

May 4. Washington Rubber Group, Technical Meeting.

May 12-15. Division of Rubber Chemistry, A.C.S., Spring Meeting, Biltmore Hotel, Los Angeles, Calif.

May 25-27. Chemical Institute of Canada, 42nd Annual Conference, Halifax, Nova Scotia.

May 25-28. ASME Design Engineering Conference, Convention Hall, Philadelphia, Penna.

June 4. New York Rubber Group, Summer Outing.

June 5. Fort Wayne Rubber & Plastics Group, Summer Outing.

June 5. Quebec Rubber & Plastics Group, Golf Tournament.

June 6-7. Southern Rubber Group, Colonial Inn, St. Petersburg Beach, Fla.

June 9. Buffalo Rubber Group, Golf Outing, Lancaster Country Club.

June 9-12. Material Handling Institute Exposition, Public Auditorium, Cleveland, Ohio.

June 14-18. ASME Semi-Annual Meeting, Chase and Park Plaza Hotels, St. Louis, Mo.

June 15-19. American Society of Engineering Education, Annual Meeting, Pittsburgh, Penna.

June 19. Akron Rubber Group, Summer Outing, Firestone Country Club, Akron, Ohio.

June 21-26. ASTM Annual Meeting, Chalfonte-Haddon Hall Hotel, Atlantic City, N. J.

June 26. Detroit Rubber and Plastics Group, Summer Outing, Western Golf and Country Club, Detroit, Mich.

Aug. 4. New York Rubber Group, Golf Tournament.

Aug. 21. Philadelphia Rubber Group, Summer Outing.

Sept. 13-18. American Chemical Society, 136th National Meeting, Atlantic City, N. J.

Sept. 13-17. National Tire Dealers & Retreaders Association, Annual Convention, Washington, D. C.

Sept. 24. Fort Wayne Rubber & Plastics Group.

Oct. 2. Detroit Rubber and Plastics Group, Fall Meeting, Detroit Leland Hotel, Detroit, Mich.

Oct. 2. Philadelphia Rubber Group, Technical Meeting, Poor Richard Club, Philadelphia, Penna.

Oct. 13. Buffalo Rubber Group, Fall Meeting, Hotel Westbrook, Buffalo, N. Y.

Oct. 16. New York Rubber Group, Fall Meeting, Henry Hudson Hotel, New York, N. Y.

Oct. 19-21. Ninth Canadian High Polymer Forum, Guild Inn, Toronto, Ont., Canada.

Oct. 23. Akron Rubber Group, Sheraton Hotel, Akron, Ohio.

Nov. 6. Philadelphia Rubber Group, Annual Dance.

Nov. 8-13. Joint International Meeting of Division of Rubber Chemistry, A.C.S.; Committee D-11, A.S.T.M., and Rubber and Plastics Division, A.S.M.E., Shoreham Hotel, Washington, D. C.

Nov. 29-Dec. 4. ASME Annual Meeting, Chalfonte-Haddon Hall, Atlantic City, N. J.

Dec. 3. Fort Wayne Rubber & Plastics Group.

Dec. 8. Buffalo Rubber Group, Xmas Party.

Dec. 11. Detroit Rubber and Plastics Group, Xmas Party, Hotel Statler, Detroit, Mich.

Dec. 18. New York Rubber Group, Xmas Party.

Jan. 29, 1960. Akron Rubber Group, Sheraton Hotel, Akron, Ohio.

Feb. 11, 1960. Fort Wayne Rubber & Plastics Group.

April 8, 1960. Akron Rubber Group, Sheraton Hotel, Akron, Ohio.

April 14, 1960. Fort Wayne Rubber & Plastics Group.

May 24-27, 1960. Division of Rubber Chemistry, A.C.S., Spring Meeting, Statler Hotel, Buffalo, N. Y.

June 17, 1960. Akron Rubber Group, Summer Outing, Firestone Country Club, Akron, Ohio.

Sept. 13-16, 1960. Division of Rubber Chemistry, A.C.S., Fall Meeting, Commodore Hotel, New York, N. Y.

May 16-19, 1961. Division of Rubber Chemistry, A. C. S., Spring Meeting, Brown Hotel, Louisville, Ky.

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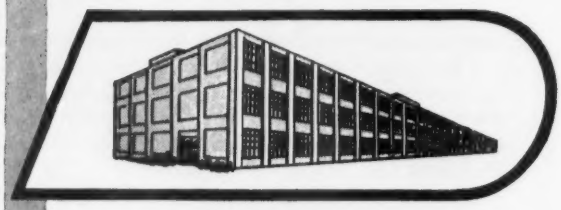

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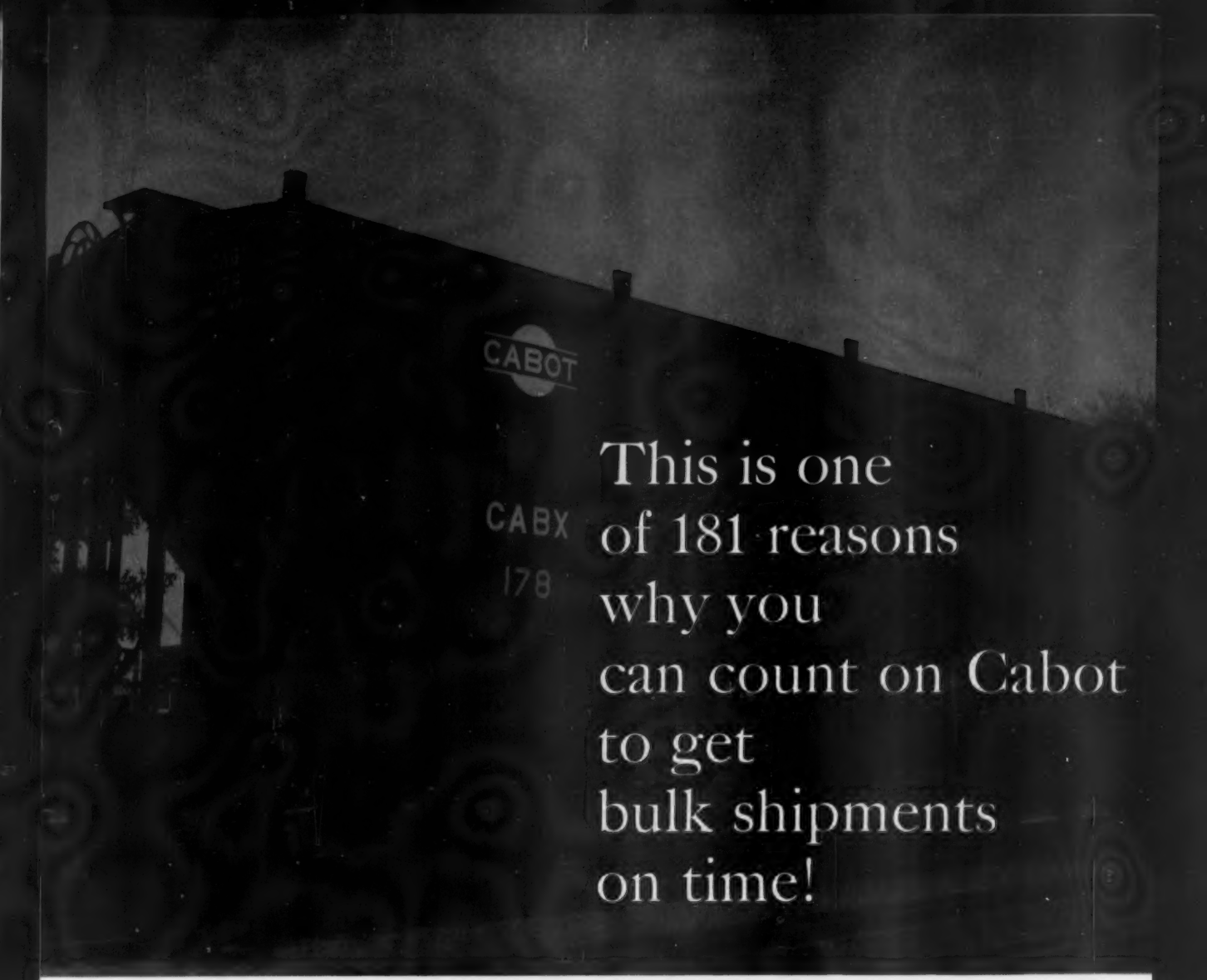

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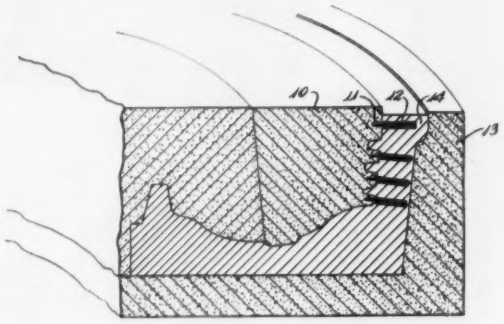
PATENT REVIEW

by Melvin Nord

Method of Making Tire Molds

U.S. Patent 2,848,910, issued August 26, 1958 to Raymond E. Bastian, assigned to Firestone Tire & Rubber Co., describes a method of making a mold for rubber tires.

In molding tires difficulty is experienced from air trapping in the tread design in the mold as the green or unvulcanized tread rubber of the tire is forced between the mold configurations that compose the tread design. If the trapped air does not escape before the tire is vulcanized, improper molding of the tire tread where the air is trapped results.



To reduce improper molding caused by trapped air, tire manufacturers vent the tire molds. Such vents comprise holes approximately 1/16-inch in diameter which heretofore have been drilled into the molds. These vent holes open on the molding surface of the mold at the areas in which trapping of air is most likely to occur if a vent were not present. The vent holes extend through the wall of the tire mold to the atmosphere which necessarily is through a substantial depth of metal. A 700-15 passenger tire of ordinarily intricate design will usually be provided with several hundred vents. Such mold vents are normally drilled by a power drill manually manipulated. The drilling requires much time and skill.

An object of the invention described here is to provide a method of making tire molds that features locating and casting the desired vent holes in the mold simultaneously with the casting of the body of the mold and thereby to avoid all or a substantial part of vent hole drilling.

The diagram above shows a positive plaster mold (10) and back sand core or cope (13) with one-half of a tire mold (14) cast about vent tubes

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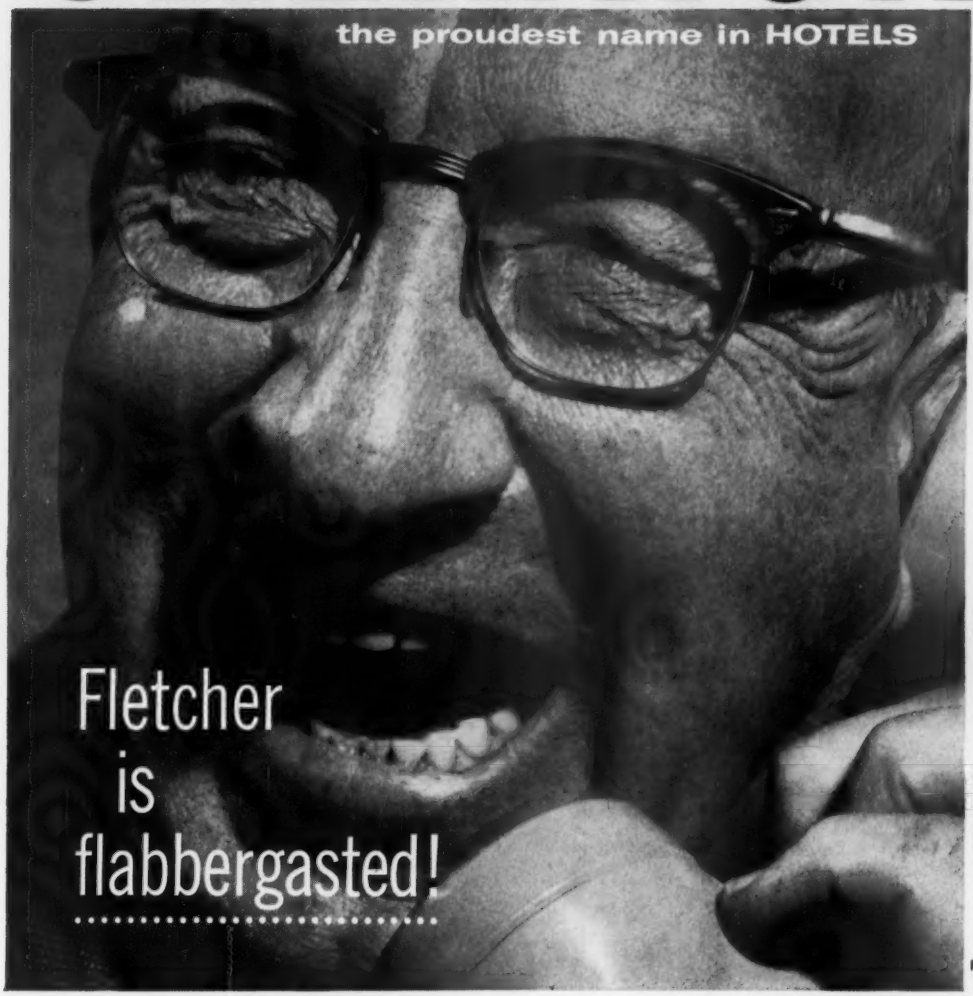

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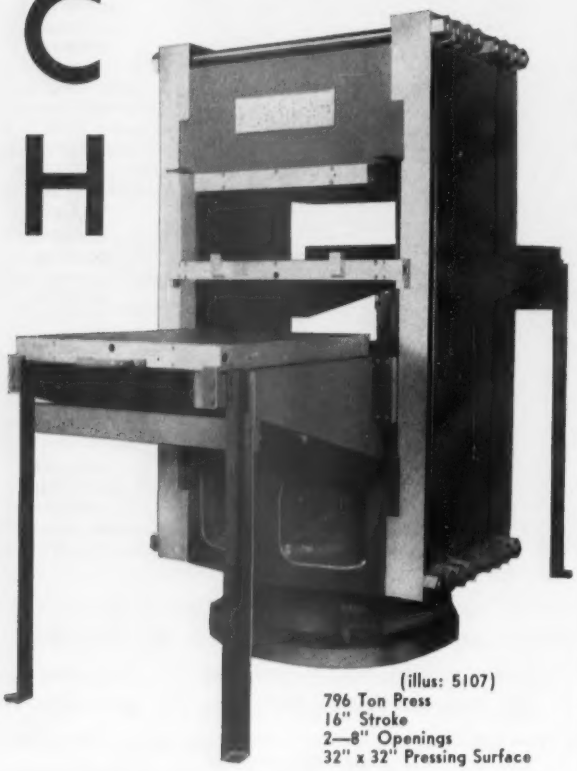

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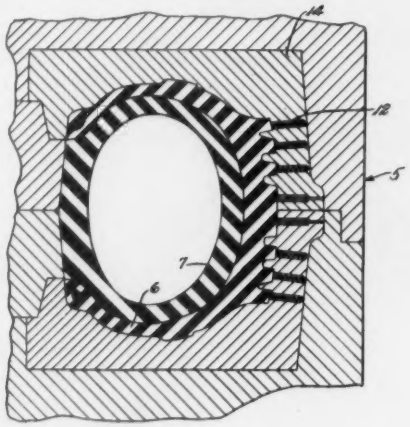
PATENT REVIEW

(12) mounted on mandrels or pins (11) projecting from the positive mold (10).

After the mold portion (14) has been poured, cooled and hardened the core (10) is broken and removed, after which the mandrels (11) are drawn from tubes (12) leaving the tubes embedded in the body of the tire mold (14). Cope (13) is then removed after which the holes in the tubes (12) are extended through the wall of the mold (14)



by drilling through the bore of the tubes and through the wall of the mold to the radially outer surface of the tire mold (14). It will be seen that it is only necessary to insert the drill into tubes (12) and drill through any metal in the bore and through a thin wall of metal to reach the outer surface of the tire mold, thereby providing the vent holes through which air may escape to the atmosphere when a tire is molded, as shown above.

Copolymerization of a Vinylpyridine

U.S. Patent 2,830,975, issued April 15, 1958 to Howard B. Irvin and assigned to Phillips Petroleum Co., describes a process for the copolymerization of a vinylpyridine with a conjugated diene, and to a method of recovering unpolymerized vinylpyridine from the resulting latex.

As shown in the schematic diagram, the selected monomers are passed via line 10 to a stirrer reactor (12) where the monomers are mixed with other constituents of a conventional recipe, including water introduced through line 14, an emulsifier through line 16, an activator through line 18, and a modifier through line 20. After the desired degree of polymerization is effected, the diene is flashed off by conventional means (not shown) and the resulting latex is

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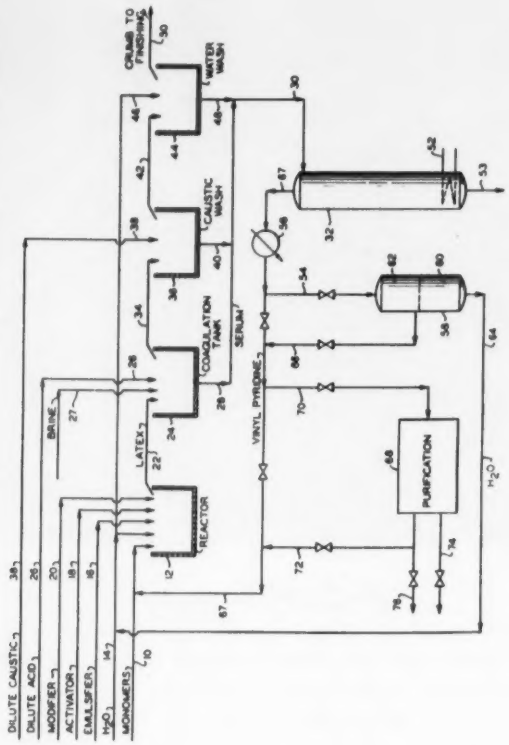
PATENT REVIEW

transferred via line 22 to a coagulation tank (24) in sufficient quantity to effect coagulation of the polymer to form a crumb. Brine may be added via line 27 when desired. The remaining liquid or serum is passed via line 28 to line 30 for passage to distillation column 32 for further treatment.



The crumb is then transferred via line 34 to a caustic wash tank (36) where it is washed with dilute caustic introduced via line 38. The caustic wash solution is passed via line 40 to line 30. The crumb, containing dilute caustic, is passed from the wash tank (36) via line 42 to a water-wash tank (44) to which water is introduced via line 46. The aqueous wash solution containing a minor amount of dilute caustic and salt is recovered via line 48 and introduced to line 30. The washed crumb is passed via line 50 to conventional finishing steps, not shown.

The combined serum, caustic wash, and water wash streams are passed from line 30 into the steam distillation column (32) into which steam is introduced directly or by indirect heat exchange near the bottom, via line 52. A bottom fraction containing water and impurities (principally salts) is removed from the column via line 53. An overhead fraction consisting of water and vinylpyridine vapor is recovered and passed

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via line 54 where an aqueous phase (60), containing from about 0.5 to 1.5 weight per cent of vinylpyridine, collects in a lower layer and where vinylpyridine collects in an upper layer (62). The aqueous phase is recycled to recipe make-up or the emulsion polymerization step via lines 64 and 14. The vinylpyridine-rich phase of layer 62 is passed via line 66 to line 10 and to reactor 12. It is preferred to pass all or a substantial portion of the recycled vinylpyridine phase through a purification system (68) by means of lines 70 and 72. Impurities from the purification system are withdrawn through line 74 and any desired portion of the purified vinylpyridine may be recovered directly through line 76. It is also feasible to pass the overhead vinylpyridine-containing aqueous overhead fraction via line 67 directly to line 10 for return to recipe make-up, directly or via purification system 68. The process described may be operated either batchwise or continuously.

The advantages claimed are: (1) The feed to the stripping tower is highly basic, a condition favorable for separating methyl-vinylpyridine from latex because acids form non-volatile salts with pyridines; (2) Atmospheric operation of the stripper (instead of vacuum) results in overhead vapors richer in methyl-vinylpyridine, a more favorable vapor-liquid equilibrium curve, elimination of vacuum equipment, less stripping steam, and little or no foaming; and (3) No fouling of the stripping column results because of latex.

Other Patents of Interest

Subject	Assignee	Patent No.	Date
Vulcanization of polychloroprene	E. I. du Pont de Nemours & Co.	2,842,530	7/8/58
Rubber latex compositions heat sensitized with polymethoxy acetals	General Aniline & Film Corp.	2,842,606	7/8/58
Stone rejecting tire tread	United States Rubber Co.	2,843,172	7/15/58
Elastomeric polyurethane compositions	E. I. du Pont de Nemours & Co.	2,843,569	7/15/58

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Contact Farrel-Birmingham for a preliminary discussion of your objectives.

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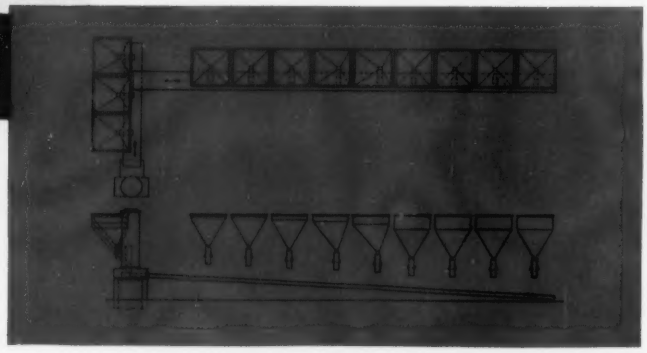
ABOVE: Battery of nine Glengarry weighing units. Poise on the graduated beam of each unit must be set for the correct quantity to be weighed out.
RIGHT: Schematic drawing of automatic weighing and charging system.



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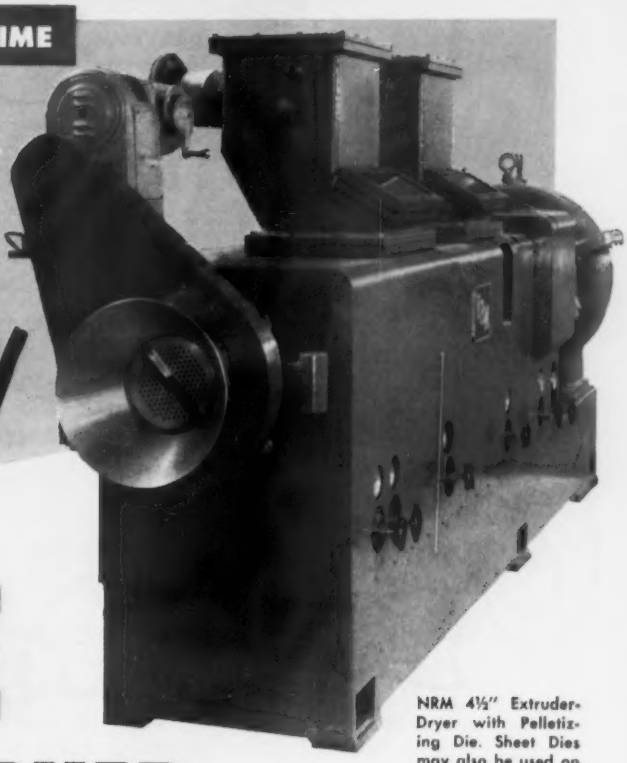

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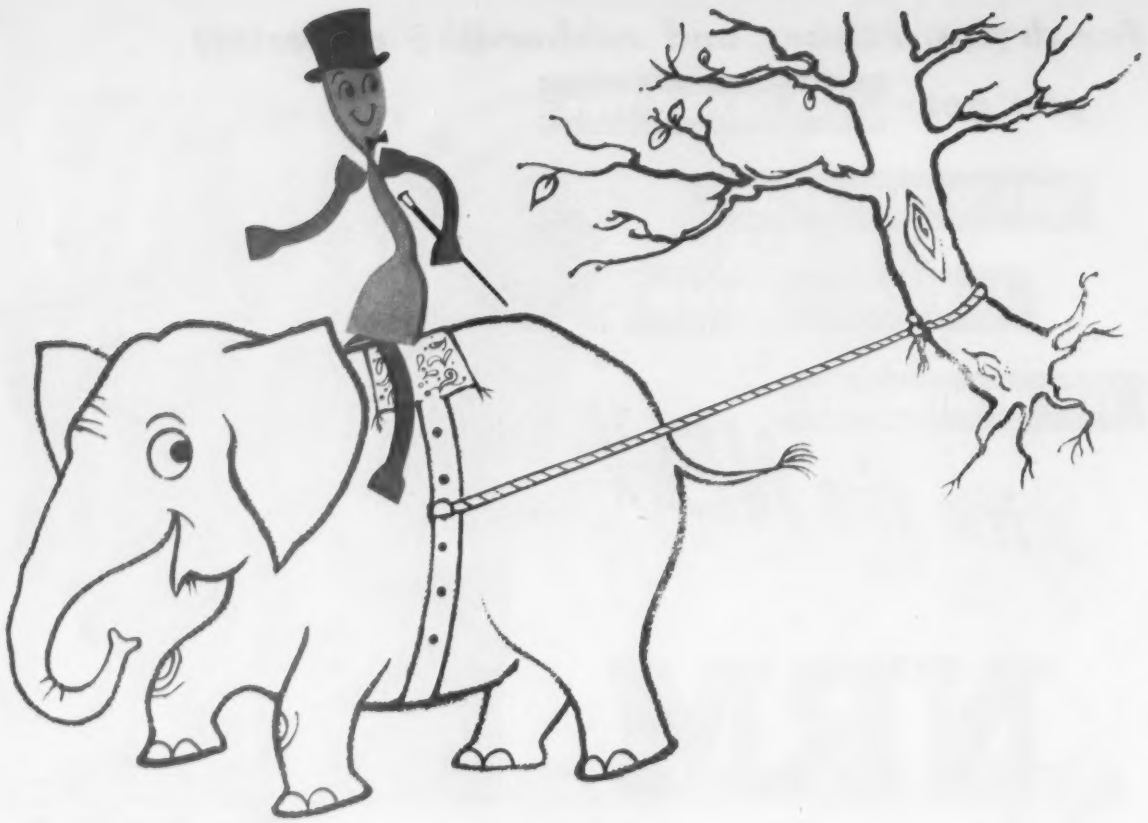

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Philprene tire treads have abrasion resistance that would make a pachyderm blush for shame! Industrial belts and hoses have an elephant's toughness and strength! You can get the qualities you need most in your finished product by selecting the correct Philprene rubber. And because Phillips Chemical Company makes the largest variety of commercially available polymers on the market, you have a wide choice.

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Capitol Cues

THE MOST LIBERAL CONGRESS IN TWO DECADES is just getting organized in Washington. The expanded bloc of "progressive" Democrats is out to extend its election victory and ram through its own programs. These men won't win every goal, but they'll make a noticeable mark. And the liberal fever is affecting Republicans, too, now that a group of their leading conservative members have retired or been defeated. As a result, GOP opposition will be less vigorous.

The big issue will be spending. The President says we must cut outlays or face ruinous deficits and inflation. Liberals claim our economy is strong enough to afford more government services. The result: the greatest number of vetoes since Ike took over.

Other than the running fight over appropriations, 1959 mainly will be one of laying groundwork. That is usual in the first session of a new Congress. Investigations will take up a lot of time—inflation and defense policy occupying the spotlight. Non-Budget legislation passed by this Congress will be light.

Congress will save its big accomplishments until next year, when they will be fresh in the voters' minds on Election Day.

THE COMING BATTLE OVER THE BUDGET for fiscal 1960—the year starting next July 1—won't come out to the Administration's liking. Eisenhower will go down the line for balance, proposing a little more for missiles, nuclear submarines, and other military weapons, with offsetting cuts proposed in many civilian activities. To get the Budget in balance, cuts will have to go deep.

But Congress, led by the liberals, won't go along. Many of the lawmakers think we need more defense. And they feel that they were elected to increase—not pare—strictly civilian services. So spending will top Ike's recommended $77 billion by $2 to $4 billion. Nor will Congress buy Ike's proposals to lift revenue, like higher postal rates and interest charges on federal loans.

NO BIG CHANGES IN TAX RATES ARE COMING this year, though there will be special adjustments important to many businessmen. The end of the recession has killed off the big argument for cuts for individuals and corporations. The large $12 billion deficit looming this fiscal year also makes any talk of cuts unrealistic. A tax hike might be more in order, but politics rules it out.

This session, as suggested above, will see plenty of spadework for substantial revisions of the Tax Code provisions on estates and trusts, partnerships, corporate reorganization, unemployment compensation, and social security. Action won't come until 1960.

DON'T GO OVERBOARD ON 49-STAR FLAGS with the new design to take care of Alaska just announced. The admission of Hawaii as the 50th state seems to be a sure thing in the coming session. Both parties are pledged to the idea.

Capitol Cues (cont'd)

Here are a few specific changes that may even pass this year:
- Auto excises, now 10% of manufacturers' prices, may be reduced to 5% or dropped entirely, if car sales do not start gaining.
- Depletion allowances for foreign oil earnings may be abolished.
- Life insurance rates will be revised; they'll be hiked by 50%.
- Federal gasoline taxes may be increased 1¢ or 1½¢ from today's 3¢-a-gallon rate to keep the highway program from going broke.
- Small business may get from Congress such help as deductions for private pension funds and fast depreciation on used tools.

A BIG FIGHT OVER LABOR LEGISLATION, maybe the biggest after spending and defense policies, is sure to come in this session. Only this time, the unions and not the Administration will be calling the shots. With election returns as their ace, the unions are preparing programs to get much of their priority legislation voted into law. And they may have quite some success.

The Democrats, especially the liberals, are preparing to go a long way to grant the unions' requests. And many Republican Congressmen, mindful of the last election, will go along, too.

These are the major labor issues which may get action in 1959:
- Labor reform: A measure along the lines of the Kennedy-Ives bill of the last session probably will pass. The unions are for it. It would clean up finances, voting procedures, etc.
- Minimum wage: There'll be hearings on proposals to increase the minimum from $1 an hour to $1.25 and extend jurisdiction to 10 million in trade and services. In the past, Congress has handled one of the two—either a higher rate or greater coverage—in any one year. This time, the hike to $1.25 has the edge for passage. The final vote won't come 'til 1960.
- Jobless pay: The states' rights issue may prevent adoption of bigger benefits for longer periods under U.S. standards.
- Right-to-work: The unions will press hard for a bill which would ban state right-to-work laws. It won't pass in 1959.

ANTITRUST LEGISLATION WILL ENJOY CONSIDERABLE INTEREST at this session. Congress is likely to vote to require advance notice to the Justice Department of mergers of big firms and to let private parties sue for treble damages for violations of the Robinson-Patman Act, as is done under other antitrust acts.

Congress probably won't vote for a federal Fair Trade law, or require leading companies to post price hikes in advance. And it isn't likely to overturn the Supreme Court's ruling that good faith in meeting a competitor's price is a complete defense to price-discrimination charges. There'll be a spate of probes—petroleum pipelines, antibiotics, shipping, tires, and baking.

HOUSING LEGISLATION MUST BE PASSED this year. Many programs will be running out and new authority is needed to continue them. The President is preparing to recommend cutbacks in funds for urban renewal projects, public housing, college housing, and community facilities. The Democrats will be fighting not only to renew all of these programs but to expand some as well.

Profits leak out when you use loose carbon black! Now you can forget about putting carbon black in your rubber recipes. Goodrich-Gulf has already mixed it for you, in new Ameripol Micro-Black masterbatch. What's more, the black is thoroughly dispersed for superior batch uniformity.

Use Ameripol Micro-Black in your plant and eliminate the costly tasks of storing, moving and weighing of loose carbon black. *Package handling* costs are also eliminated because Micro-Black is shipped bareback.

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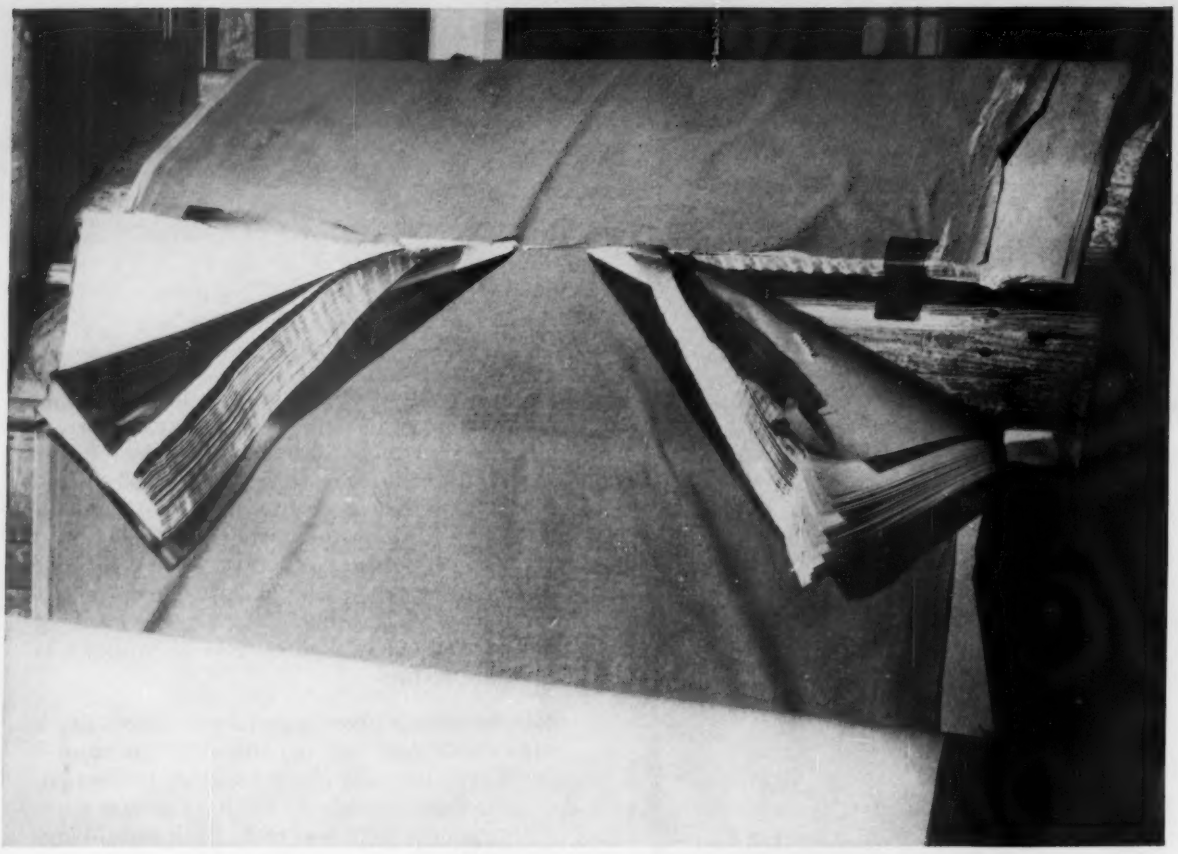

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Linerette separating paper plied up with frictioned stock before being cut in the clicking operation, saves time and money. Since 1925 Linerette, the specially processed separating paper, has been used with steadily increasing acceptance. It assures clean, fast separation without adhesion and contains no oil or wax. Here is how Linerette can help you:

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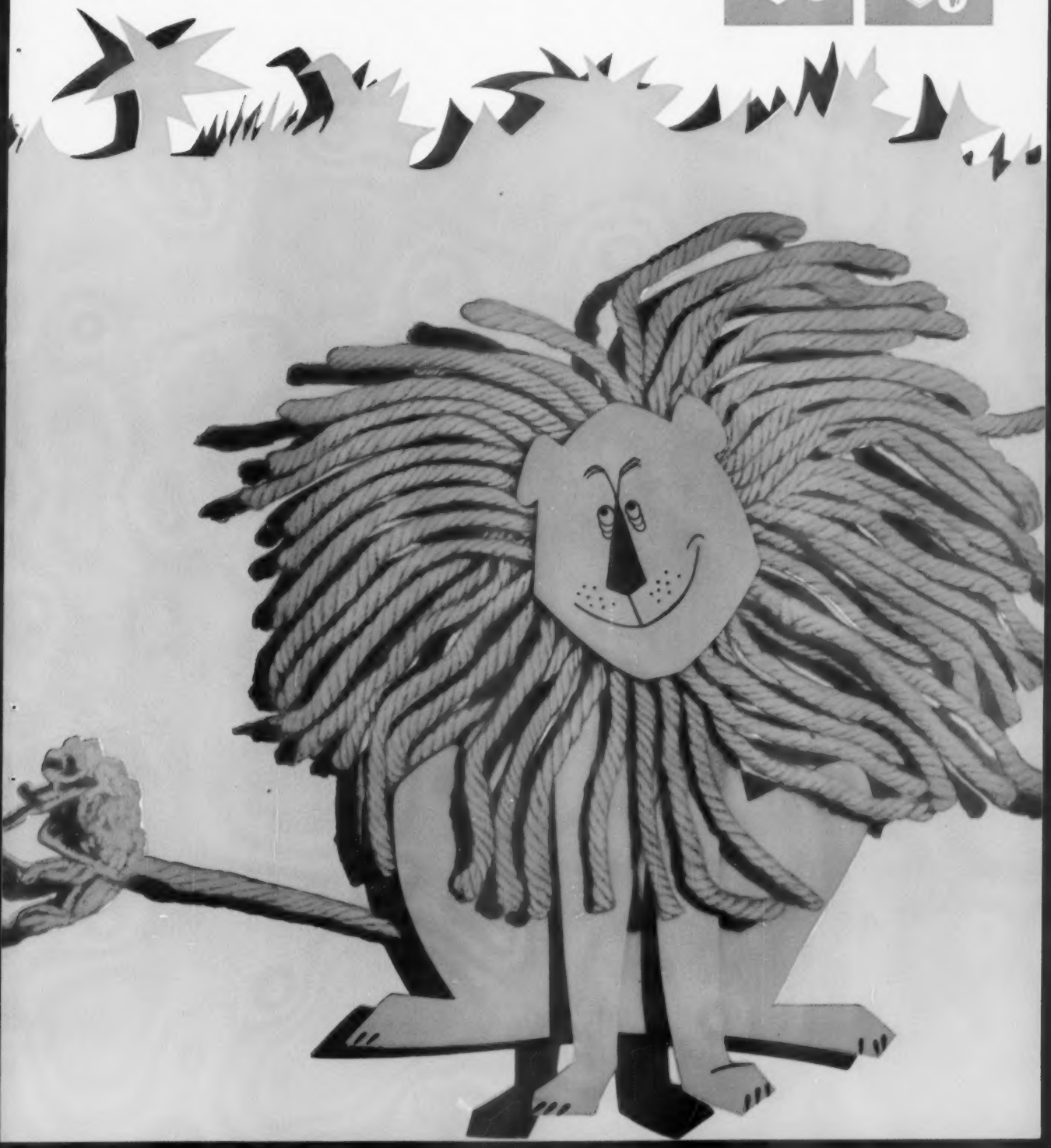

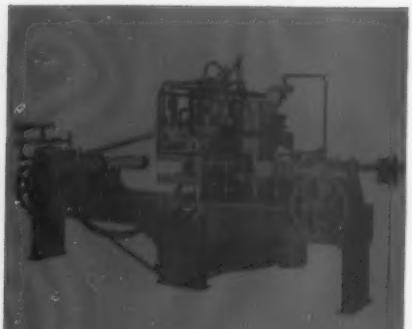

Open Gap 47-Ton Belt Press for curing flat and V-type transmission belts. The moving platen is accurately machined from a rolled steel slab and is guided by long, full-round babbitted guides on the strain rods. Intermediate platen has drilled channels to provide two heating circuits, one for each surface. For information on this or other presses for the rubber, plastics, woodworking or metalworking industries, write us today.

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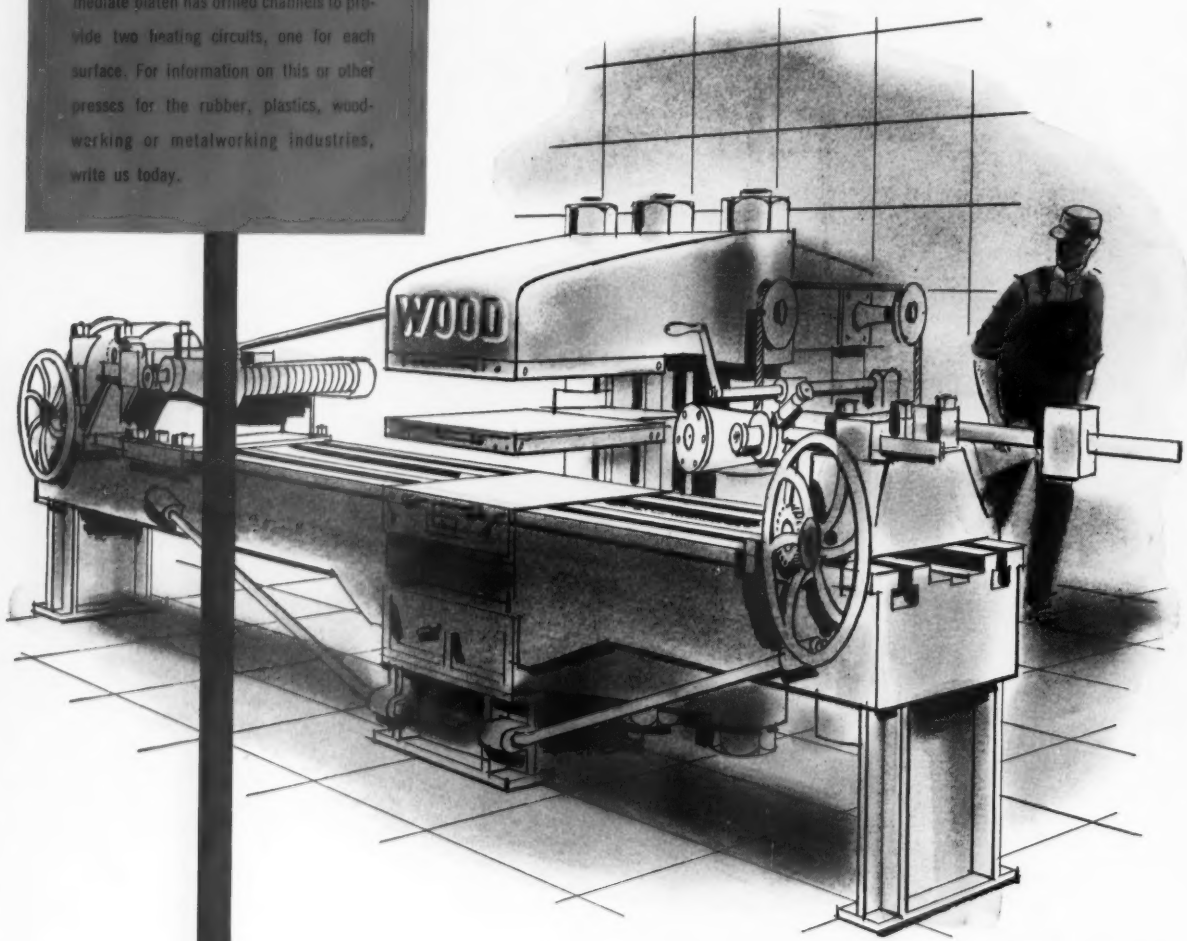

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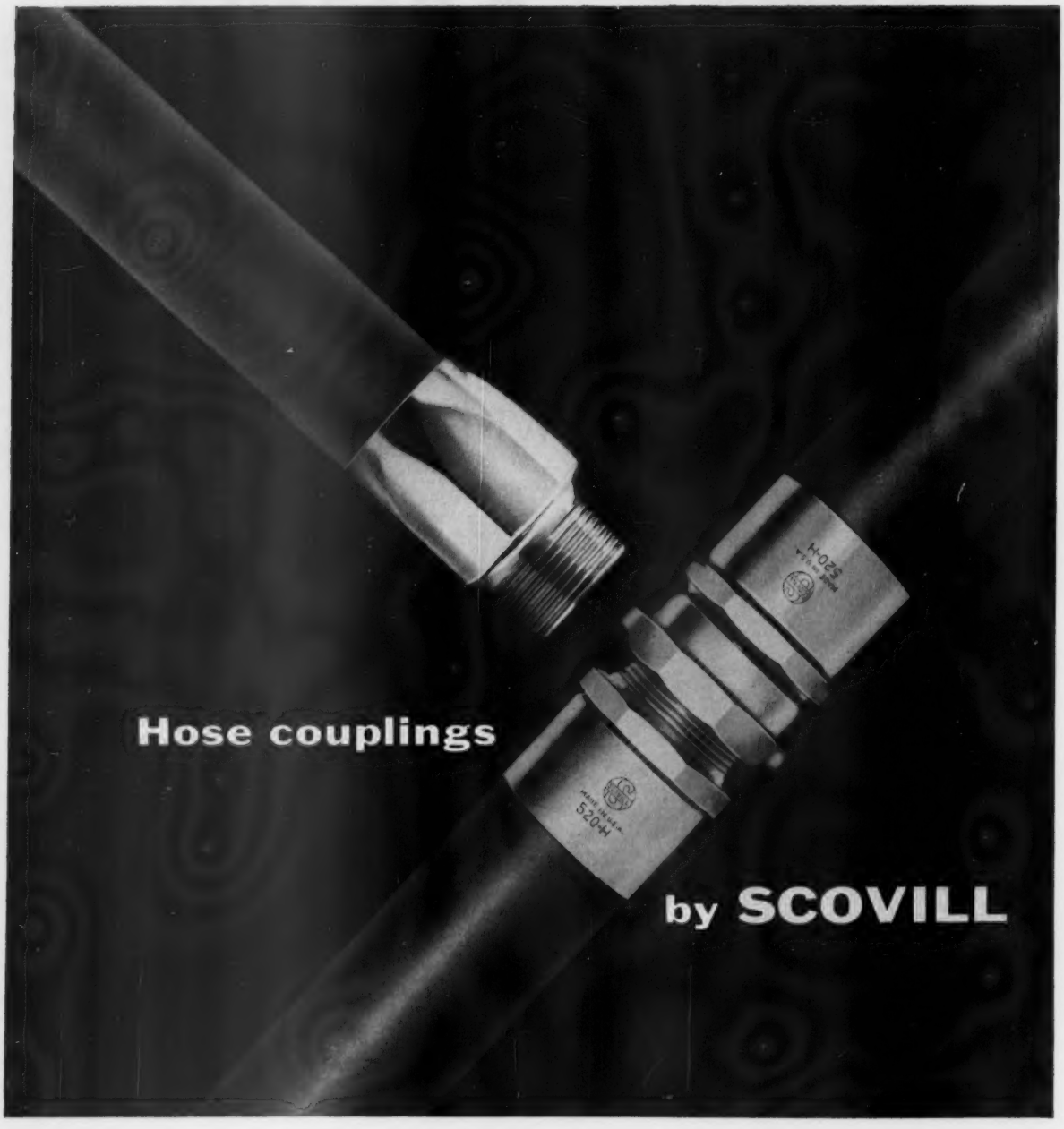

• The plastics industry in Austria is becoming increasingly aware of the potentialities of plastics, though their use per capita is lower than that of most other West European countries. Austria manufactures about 11,000 tons of plastic raw materials from its own resources and imports a similar quantity, mostly from West Germany. The demand for imported plastics is expected to increase within the next few years, before Austria's industry has expanded sufficiently to satisfy the market.

Materials which are not manufactured in sufficient quantity and which will, therefore, be imported include cellulose acetate, which is used in granulated form as extrusion material and as film for packing; acrylic and alkyd moldings, extrusions, resins and solutions; cellulose nitrate sheets, rod, films; epoxide and resorcinol formaldehyde cast resin blocks; polyamide (nylon), polystyrene and vinyl (PVC) solutions, emulsions, dispersions and pastes. PVC is produced in Austria but both raw materials and compounds, especially for the cable industry, are imported. Polyethylene and its compounds are becoming increasingly popular, but there is no domestic production.

• Formica, a member of the De La Rue Group and a company in which American Cyanamid has a 40 per cent interest, has formed a wholly-owned subsidiary in West Germany. Until now, the manufacture and sale of Formica decorative laminates in that country has been carried on under license by Elektro-Isolier Industrie Wahn, of Wahn, near Cologne. That license has been terminated by mutual agreement. Manufacture and sale of decorative laminates by the new subsidiary company, which will be known as Formica G.m.b.H., has already started.

• A new international subsidiary of the Pittsburgh Plate Glass Co., to be known as Pittsburgh Plate Glass International, S.A., has been formed in Geneva, Switzerland. The Swiss subsidiary will integrate all phases of international business for the Pittsburgh Plate organization, including licensing, investment, manufacturing and marketing functions.

• Albright and Wilson Manufacturing Ltd., London, England, has made an agreement with the Hooker Chemical Corp., North Tonawanda, N.Y., which covers the manufacture and sale of "Hetron" resins, polyesters based on Het acid. Hooker Chemical holds patents covering the manufacture and use of polyesters based on Het acid. Albright and Wilson now has rights under these patents including the right to sublicense, for the whole of western Europe, South Africa, Australia and New Zealand.

Hetron resins are polyesters based on Het acid, sometimes known as chlorendic acid. The use of this acid in a polyester, which is said to result in a resin having self-extinguishing properties, is already well known. Major applications such as roof lights made from Hetron resins, have been approved by insurance companies and housing authorities. Other applications range from their use in aircraft — for radomes and structural uses, to the chemical industry for fume ducts, blowers and tanks.

• Red China is expanding her plastics capacity. According to the second five-year plan, new factories will be able to produce about 56,000 tons of plastics a year by 1962. In the new chemical center in Kirin (Manchuria), new factories will be built for the production of synthetic rubber, plastic materials of all kinds and synthetic fibers.

• The Japan Rubber Importers' Association has reported that Japanese rubber importers are doing their best to resume imports of Thai rubber on a large scale in an effort to restore equilibrium in trade between the two countries. According to the Association, the Japanese rubber manufacturing industry attaches a great deal of importance to Thailand, which was expected to expend nearly $4 million on automobile tires and other Japanese goods last year. Thailand had previously implied she might have to restrict imports of Japanese goods unless the trade equilibrium was restored by increased Japanese imports of Thai goods such as rice and rubber.

• The West German plastics industry is confident that it will retain its position as the world's second largest producer of plastics in 1958, according to the Association of the West German Chemical Industry. Production is expected to increase to about 630,000 tons compared with 561,000 tons in 1957, the Association states.

Large investments made in the past few years to expand the German plastics industry's capacity are now showing their effects. Between 1955 and 1957, about 550 million to 600 million marks (about $143 million) were spent for that purpose.

• Construction of a new synthetic rubber and plastics plant has begun at Villers-St. Sepulcre, north of Paris, France, in accordance with an agreement between Ugine and the U. S. Rubber Co. Ugine has acquired exclusive licenses under the agreement to manufacture a wide range of special rubbers, latex and plastics material, derived from butadiene. The plant is expected to go into production in January 1960.

On the Continent (cont'd)

• It has been estimated that in September 1958, Russia had imported 16,000 tons of natural rubber, while Red China had imported 17,000 tons. Total rubber imports for these two countries by the end of the third quarter of 1958 were 155,250 tons and 93,750 tons respectively. This represents approximately 17 per cent of the world's total rubber consumption during the first three quarters of 1958. In the same period of 1957, imports into these two countries totaled 69,200 tons and 86,150 tons respectively, representing approximately 11 per cent of the total consumed.

• A French furnace type carbon black, "C-27" carbon black, produced by the Societe des Produits Azotes, has been compared with two F.E.F. and H.A.F. types from the United States. The French black is similar to United States products in such physical properties as particle diameter, oil absorption and pH. Incorporated into rubber, C-27 is said to impart about the same characteristics as the F.E.F. black, but rates much higher than F.E.F. and even H.A.F., as far as both compression set and modulus are concerned. It is quite easily extruded and offers a lower swelling rate than both reference products.

• French tire production in 1957 exceeded 31 million units. French factories manufactured 8,650,000 tires for passenger cars; 3,070,000 for trucks of all kinds; 850,000 for tractors; 26,000 for airplanes; and 19,000,000 for bicycles and motorcycles.

• Naugatuck Chemical Division of the U. S. Rubber Co. and Farbenfabrik Bayer, A.G., in Leverkusen, Germany, formerly a division of the dissolved I. G. Farben Co., have concluded an agreement to exchange research and development efforts and technical experience. There will also be mutual licensing of patents concerning the manufacture of chemicals and supplies for the production of synthetic rubber. The management of the Bayer company has emphasized that the agreement will enable both organizations to manufacture new products and to increase production efficiency in the present lines of chemicals at both companies.

• The Swedish Rubber Technical Association has published a book containing all papers presented at the recent international meeting of the rubber industry, which took place at Marstrand, Sweden. A number of important authorities in the rubber industry covered the latest developments in the manufacture and processing of rubber and associated materials. Most of the papers are printed in English. Swedish contributions are preceded by a synopsis in English. The price of the book is 25 Swedish Kronen ($5.00). It can be ordered from Sveriges Gummitekniska Foerening, Box 7310, Stockholm 7, Sweden.

• A new Italian plastics association, L'Istituto Italiano degli Plastici, 1 Galleria Passarella, Milan, Italy, has been organized in order to develop and promote the use of plastics of all kinds and to cooperate in the extension of research efforts in the field of synthetic resins. The exchange of technical and commercial information on a national and international basis and the organization of meetings and exhibits are additional goals of the new organization.

• East Germany plans to have the largest carbide factory in the world, which will be called the VEB Chemische Werke Buna. Located in Shkopau, Germany, the facility will receive considerable credits during 1959 in order to increase its capacity, most of which will be contributed by Russia. Production at the carbide section of the factory will reach a capacity of 800,000 tons a year in 1965, according to the East German Planning Commission. At that time, Chemische Werke Buna will ostensibly be the largest carbide factory in the world, manufacturing 368 different chemicals and products. More than 90 per cent of these products will be carbide derivatives or compounds.

• According to the Ministry for Chemistry of the U.S.S.R., in 1957, Russia produced 64,800 tons of phenol resins; 53,800 tons of urea and melamine resins; 28,200 tons of epoxy and alkyd resins; 20,000 tons of fluoro-carbons and related compounds; 12,800 tons of capolactames and nylons; 2,200 tons of silicones; and 60,500 tons of miscellaneous thermoplastics. This amounts to a total of 242,300 tons of synthetic plastics produced in Russia that year.

• Production of plastic shoes has become completely automated at a Norwegian company, Norsk Extruding, Notodden, East Norway. The firm has developed an automated machine with a daily capacity of 15,000 to 20,000 pairs of plastic shoes. Several units, ordered by customers in the United States, England and West Germany, are said to be in production right now.

• The plastics industry is expanding in South Africa, where a factory to make polyvinyl acetate, belonging to Mowillith Co. of South Africa, has been opened by G. E. D. Sutton, president of the Natal Chamber of Industries at Mobeni, Durban. The company is an associate of the German Farbwerke Hoechst. The Dutch Hamer Holding also has an interest in the plant.

• Chemicals, including butyl acetate and PVC, worth approximately 3 million Kronen ($420,000), are to be exported to the Soviet Union by Norway under a new three-year trade agreement, which became effective January 1, 1959.

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Sunoco's "Custom-Made" Process Oils Ease Problems Of Quality Control

Sun Oil Company custom-refines *seventeen narrow-specification* Rubber Process Oils for the rubber industry. Each one is designed to fit a special need for product quality or economy.

THE TABLE ON THE RIGHT gives some facts about six of Sun's most widely used Rubber Oils. Others, not listed, include a series of paraffin oils with low aromatic content; naphthenic oils with moderate aromatic content; and Sundex oils with high aromatic content.

IF YOU PROCESS	USE	BECAUSE
Light-colored oil-extended polymers (1703, 1708, etc.)	CIRCOSOL® NS	It combines superior nonstaining characteristics with best processibility, imparts good physicals. Primarily an extender.
Oil-extended polymers (1703, 1708, etc.)	CIRCOSOL 2XH	It's a general-purpose softener and extender for light-colored rubber goods, especially where optimum physicals are required.
Regular neoprenes, natural rubber, Hypalon (where color is a problem)	CIRCO® LIGHT	It's an ideal all-around moderate-priced plasticizer for nonstaining reclaims and butyl inner tubes, SBR, GN, W, WRT.
Oil-extended polymers (1705, 1710, etc.) and natural rubber, Hypalon (where color is no problem)	SUNDEX® 53	It's a double-distilled aromatic plasticizer for tire-tread stock, rubber footwear, matting, toys, semi-hard rubbers, high-Mooney WHV.
Black master-batch polymers 1706, 1711, 1712, etc.	SUNDEX 1585	It's a new highly aromatic plasticizer for tough polymers where easy processing is desired. This is a distilled process aid.
Natural rubber, SBR polymers, regular and WHV neoprenes, acrylonitrile polymers	SUNDEX 85	It's especially recommended for very high loadings of WHV neoprene (from 75 to over 100 parts Sundex 85 to 100 parts polymer). Used in hard rubber goods.

- To help you select the correct oil for your individual needs Sun has just published a new brochure: "A GRAPHIC METHOD FOR SELECTING OILS USED IN COMPOUNDING AND EXTENDING BUTADIENE-STYRENE RUBBERS."

  Get a copy from your Sun man or write Dept. RA-2.

INDUSTRIAL PRODUCTS DEPARTMENT

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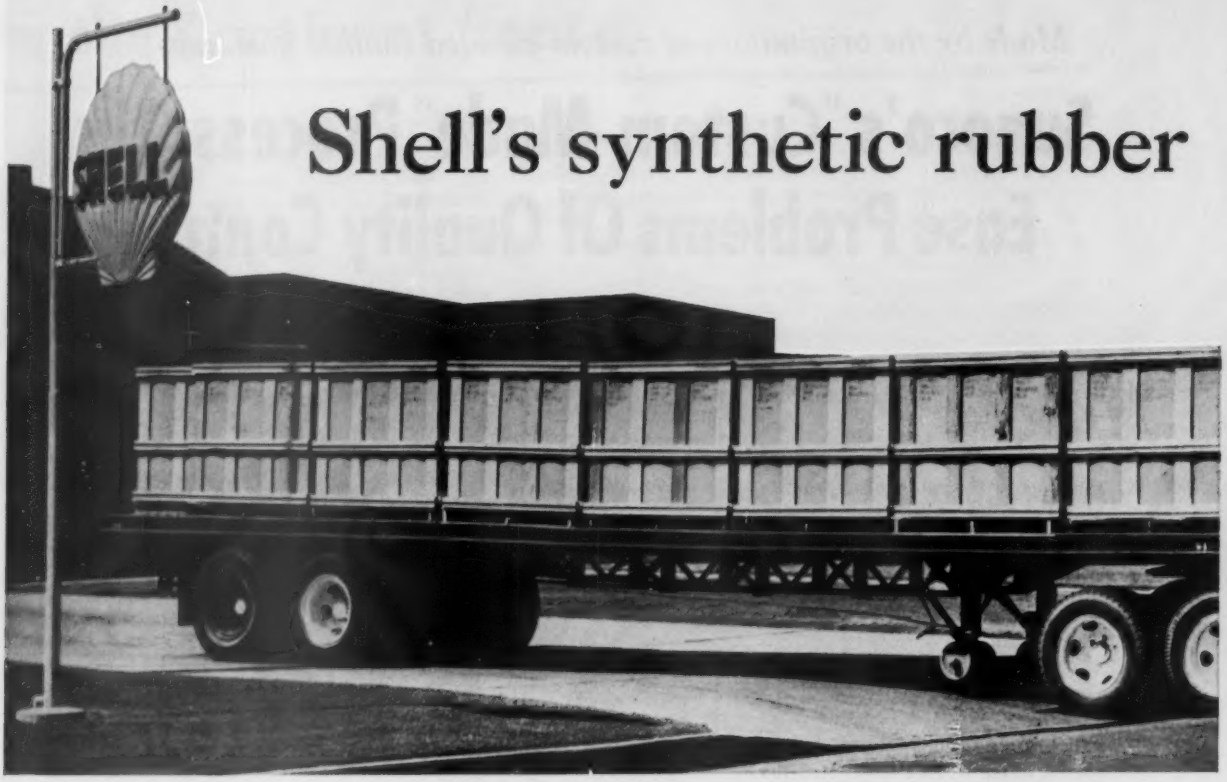
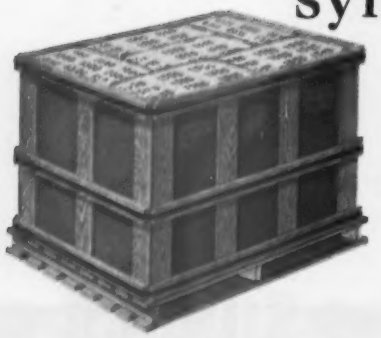
Shell's synthetic rubber



...at your service with the synthetic rubber from one



NEW "FLOTAINER" CONTROLS COLD FLOW

Shell offers you the Flotainer* package, a strong, lightweight, steel-strapped wooden container that holds 42 film-wrapped bales. Completely new in principle, "Flotainer" controls cold flow in uncured synthetic rubber; prevents contamination; simplifies and speeds handling; lets you store 20 tons of rubber on less than 100 sq. ft. of floor space. For more information on this packaging innovation, write Shell for an illustrated bulletin.

***Shell Chemical Trademark**

When you need general-purpose synthetic rubber, remember that Shell Chemical has at Torrance, California, the widest selection of commercial and experimental polymers available from a single source.

You can choose a Shell polymer for many uses, or one of Shell's many new additions (some are specially tailored to fill specific needs) to help improve your product, save time, reduce costs.

task force...

20 tons of neatly packaged rubber move out on a nonstop journey from manufacturer to customer

widest selection of dependable source!

Shell Chemical is engaged in one of the broadest research programs in the synthetic rubber industry. New polymers, higher quality, unique packaging, fine service are results which benefit the manufacturer of rubber goods.

Shell's Technical Service, too, is ready to help solve your manufacturing problems. Our telephone number in Los Angeles is FAculty 1-2340.

TRY THESE SHELL POLYMERS

One or more of these may be the answer to your technical problems. Complete information on all Shell S-polymers is yours for the asking . . .

S-1009

MINIMIZE SHRINKAGE AND SWELL in extruded and calendered stock by addition of 10 to 50% of S-1009 (styrene-butadiene cross-linked with divinyl benzene).

S-1011

This unique polymer is **GEL-FREE.** Use it for superior **ADHESION** and **SEALANT** applications. It can also be used in light-colored goods because of its desirable color properties.

S-1013

If you're looking for high thermoplasticity . . . low water absorption . . . good flow characteristics, S-1013 may be your answer. Its uses include **CAN-SEALING COMPOUNDS, COATED FABRICS, MOLDED GOODS.**

S-1502

This polymer is the **ALL-PURPOSE** cold rubber. Light-colored, clear, its balance of physical properties makes it suitable for a variety of uses—from white sidewalls to chemically blown sponge.

S-1703

When you want **ECONOMY** with **COLD RUBBER** properties and processing advantages for use in light-colored goods, consider this **OIL MASTERBATCH** of 25 parts of nonstaining oil in 100 parts of polymer.

S-1804

You can reduce mixing time by using this oil black masterbatch in making **TREAD RUBBER** and **MOLDED** or **EXTRUDED GOODS.** It contains 10 parts of oil and 60 parts HAF black to each 100 parts of S-1500 type polymer.

S-2000

Here is an **ECONOMICAL** medium-solids hot latex with **HIGH STYRENE** content for better tensile and film strength. Use it for spreading and adhesive applications. Its small particle size aids penetration.

S-2105

FOR FOAM RUBBER and any other application which demands high strength and good color properties, this cold, high solids latex has found widespread acceptance.

S-2107

This **HIGH SOLIDS COLD** latex is identical with S-2105 except for its **HIGH STYRENE** content. It has excellent color characteristics and film strength and is used in upholstery and rug backing.

SHELL CHEMICAL CORPORATION

SYNTHETIC RUBBER DIVISION
P. O. BOX 216, TORRANCE, CALIFORNIA

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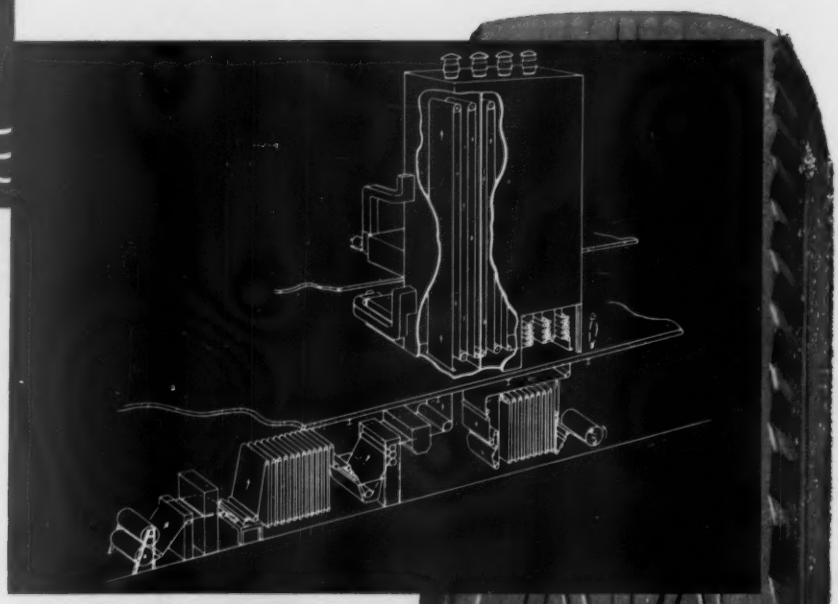
ROSS
Air Systems

Engineered Atmospheres for Better Processing



TIRES

...product of an 'Engineered Atmosphere' plus mechanical ingenuity

Statistics indicate that at least 75% of the passenger car tires made in the United States and a large part of those made abroad are processed in the Ross-Waldron Cord Tension Latex Dipping and Drying Unit.

Three typical operational steps are involved: (1) Latex dipping and drying of the 60" web with its 2,000 individual cords followed by (2) application of heavy tension (30,000 pounds) across the entire width while (3) passing through a heat tempering zone of 450°F. or more and subjected to the proper time exposure as related to machine speed; followed by a relaxing heat zone of 450°F. or lower temperature with an application of 30,000 pounds tension on the web. Production speed is 10 to 100 yards per minute. Processing skill can be found in the design of the Latex dipping and curing unit and by the control methods set up to assure a satisfactory end product. Mechanical ingenuity is reflected in the Tensioning System.

Ross-Waldron since 1935 have engineered and built over 70 units for practically all domestic tire manufacturers; and over 25 units for foreign tire plants throughout the world.

Many of the units for domestic and foreign plants were designed to treat both rayon and nylon tire fabric at tensions and temperatures as required.

In the rubber field numerous Ross Curing Ovens can be found, which include one of the largest Airfoam installations, designed, built and installed for Goodyear Tire & Rubber Company in 1956. This unit consisted of pouring, jelling, curing, stripping, cooling, drying and conditioning.

Other fields served in connection with 'Engineered Atmospheres' include pulp, paper, plastics, foundries, metal painting, pharmaceuticals and chemicals.

* John Waldron Corporation, an affiliate of J. O. Ross Engineering, has devoted practically all of its business life of 132 years to the engineering, design, and manufacture of web-processing machinery. Ross and Waldron engineers work together on many projects of which this Tire Processing Unit is an excellent specific example.

M-R

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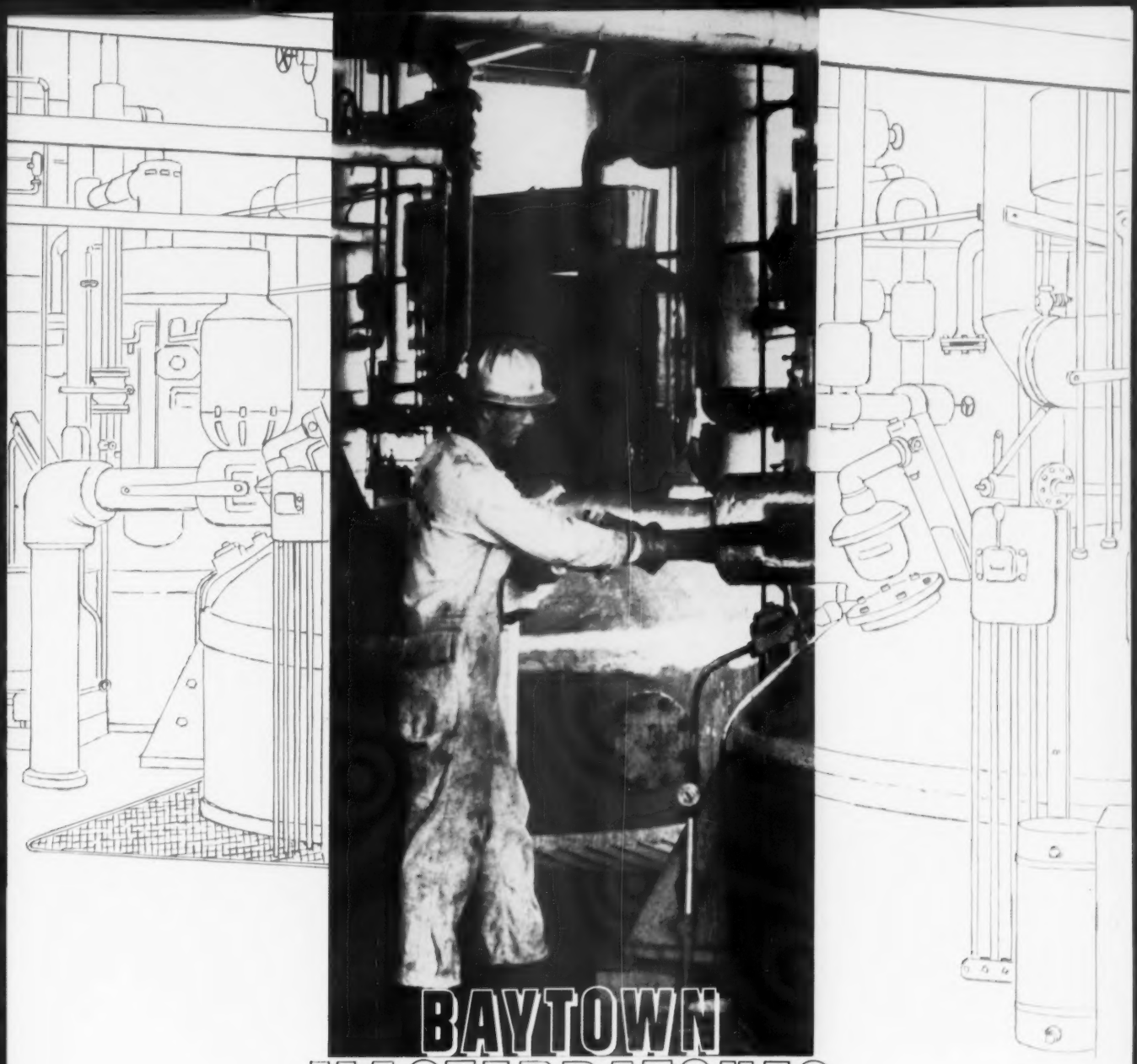

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BAYTOWN MASTERBATCHES have a reputation for unsurpassed quality and uniformity — a reputation built on an unprecedented record of production experience.

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The D-S Caterpillar Capstan is specially designed to provide precisely controlled, heavy pulling power for large diameter cables. The increased gripping area and straight line pull of the caterpillar design prevents scuffing, fraying, and bending of heavy cables by the capstan.

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- Special tread grips *around* cable for maximum grip without insulation damage.
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- Alternate tread materials available with resiliency, excellent friction, and abrasion resistance.
- Treads open and close on common cable centerline and are articulated to follow cable variations.
- Maximum cable speeds of 100 or 200 feet per minute. Other speeds available.
- An optional lead wire capstan allows wire rope to be attached to cable end to start cable through treads.
- Adjustable guides which center cable within the tread.

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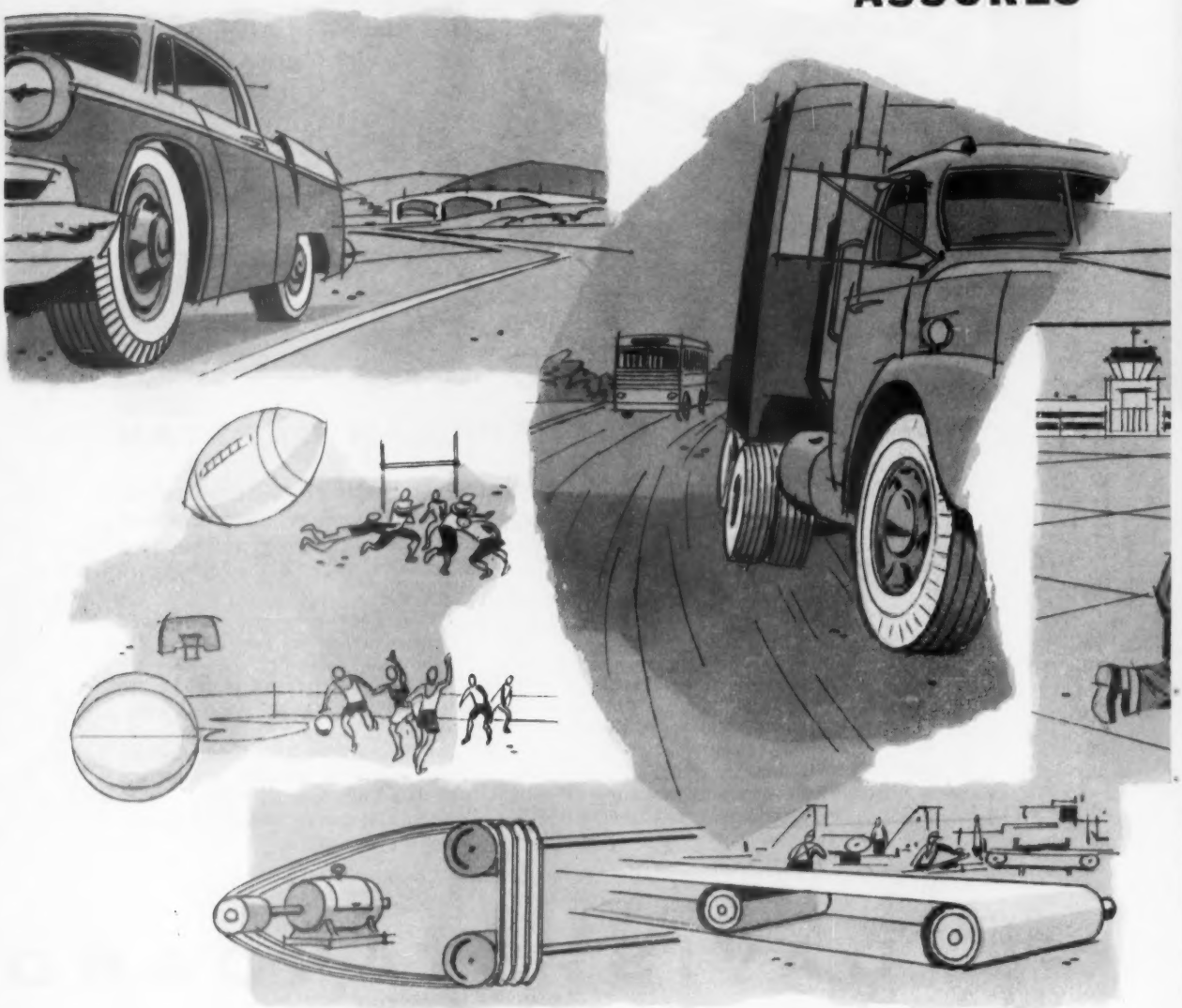

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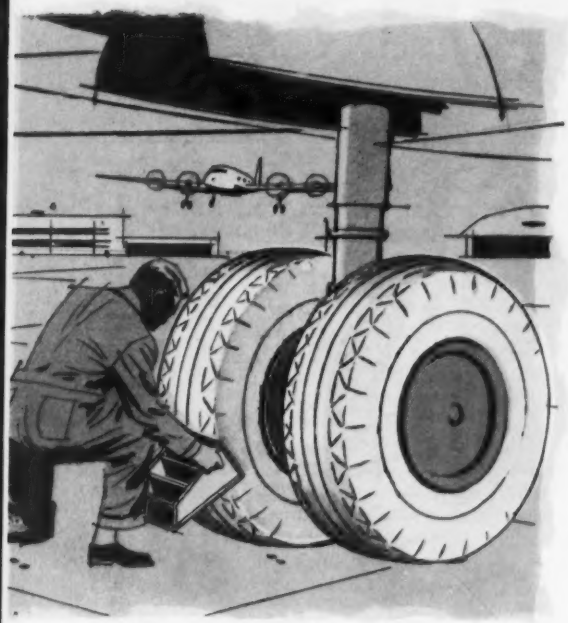

The rubber industry's problem of achieving better adhesion to meet today's high-speed needs is being solved everywhere by Gen-Tac. This unique vinyl-pyridine latex, added in minimum quantities to fabric dips, provides vastly superior bonds between rubber stock and rayon *or* nylon fabrics. Fabric thus treated assures improved fatigue resistance, reduction of curing blows, and fewer ply separations in service.

Manufacturers of airplane, truck, bus and passenger tires, V-belts, hoses, inflatable rubber products, and industrial goods in every part of the world have tested and adopted Gen-Tac as the truly universal solution to adhesion problems. If you manufacture rubber products containing fabric reinforcement, Gen-Tac offers a valuable contribution to product improvement.

Write for this new bulletin, packed with valuable information on Gen-Tac and the many advantages it affords.

THE GENERAL TIRE & RUBBER COMPANY
Chemical Division, Akron, Ohio

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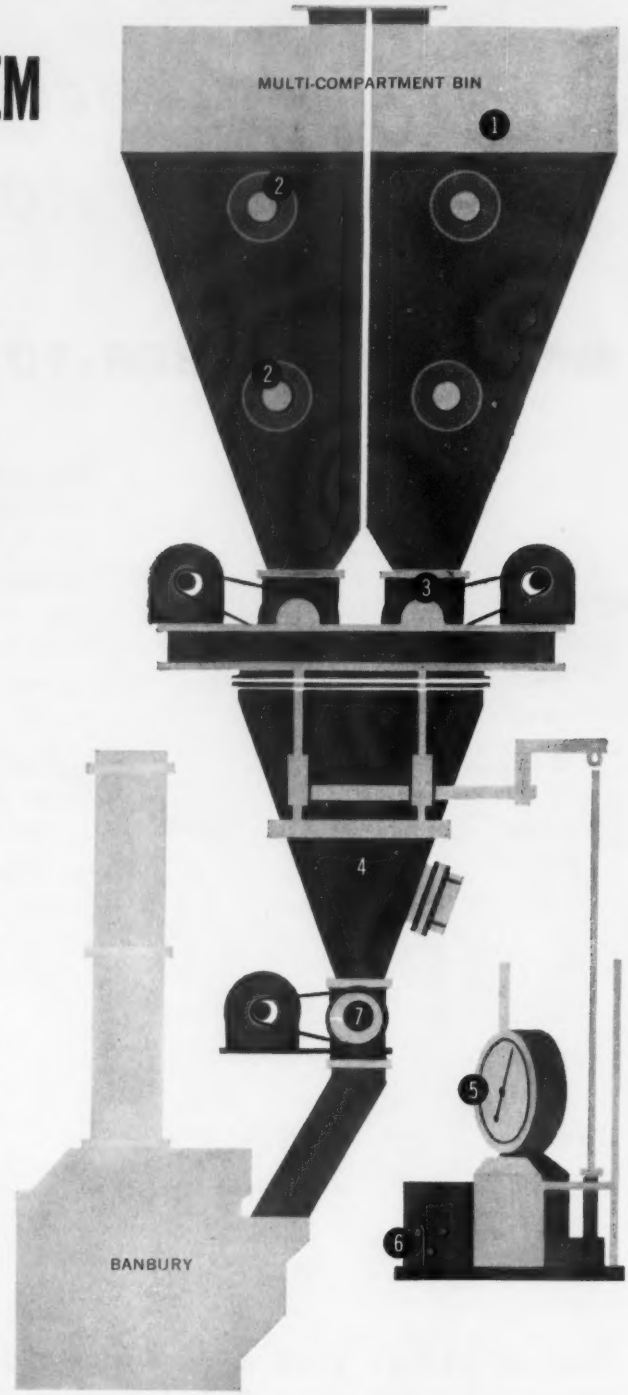

1. **BINS** . . . KENNEDY bins are designed and fabricated for free flow without bridging. Separate bins are provided for each type of black.

2. **LEVEL CONTROL** . . . High- and low-level controls actuate the carbon black conveyors to the bins, maintaining a steady supply of blacks.

3. **FEEDERS** . . . Proven KENNEDY design provides uniform "Stream-in-air" for accurate cut-off and close weighing tolerances.

4. **WEIGH HOPPER** . . . The design of the weigh hopper assures complete cleanout between batches.

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6. **CONTROL CENTER** . . . After manual preselection of the feed sequence and black weights, this center automatically controls the entire feed operation. Cycle is automatically repeated. Batch weights are accurately duplicated.

7. **ROTARY DISCHARGE GATE** . . . When actuated by the control center, the weigh hopper gate discharges the weighed blacks into the Banbury at a rate which can be set to meet mixer cycle requirements.

KENNEDY Carbon Black Systems in rubber plants throughout this country and abroad are doing an outstanding job of producing more uniform batches under cleaner working conditions without manual handling.

To get the best out of your existing equipment, install a KENNEDY Carbon Black Proportioning System. Ask a KENNEDY Engineer to show you how this package can improve your carbon black operation. There is no obligation.

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As Soule Sees It...

Sea-Going Snakes

Something new in the way of a flexible floating container for the transportation of various light-gravity liquids via water routes was recently publicly demonstrated in England. The item is referred to as a flexible barge since it is expected to compete with a conventional tank barge.

The British model, known as the "Dracone," (a Greek word meaning serpent), was made for the Dracone Co. by P. B. Cow and Co. Ltd., and is said to have been based on a design which originated with three Cambridge University professors. Before the present model was built, several smaller flexible barges underwent extensive tests, which demonstrated the maneuverability, the sturdiness and the economy of operation of this type of container. The Dracone is 100 feet long and five feet in diameter. The strength member is a woven nylon fabric, coated inside and out to a wall thickness of 5/32 inch with synthetic rubber layers designed to resist sunlight, sea water and whatever cargo is being transported. The weight of the empty vessel is reported to be about 2300 pounds and its capacity 10,000 imperial gallons.

The barge is fitted with grommets at both ends to which ropes are fastened for towing or mooring operations. At the stern is a four inch hose connection through which the cargo can be discharged in about twelve minutes, with a pump similar to those carried on oil tankers as standard equipment. When empty, the Dracone can be wound up on a squirrel-cage reel, and later removed and folded or rolled for further use.

It is claimed that one of these flexible barges costs about 50 per cent less than a conventional tank barge, and that its use could materially reduce the costs of shipping oil or other lighter-than-water liquids. Emphasis has been placed on the fact that the conception, design and execution of the Dracone is completely British. Whether or not it is patented has not been stated.

In this connection, it is interesting that Reichhold Chemicals, Inc., New York, N. Y., has announced that the company will import and distribute in the United States "a new type of German flexible plastic barge." Made of PVC, the 100 foot long model weighs 50 pounds and has a skin (wall?) thickness of 0.03 inch. Since the diameter is not mentioned in the trade release, it is not possible to tell whether the entire wall thickness is PVC, or whether a fabric insert is also included. General methods of use and claims for economy, etc., of this container are similar to those made for the British Dracone.

It will be interesting to see how these developments proceed and whether or not any of the rubber companies in the United States, with their wealth of experience in the fabrication and application of flexible containers of varied shapes and sizes for transporting various liquids on or over the road, will be content to stay out of this new type of water transportation.

I might add a word of caution to the myriad weekend Admirals, who are now, or will soon be taking their yachts, cabin cruisers and what have you, for a run along their favorite stretch of water. If you see what appears to be one or more oversized boa constrictors sporting along in the wake of a tug or barge, don't send out an S.O.S. for the Coast Guard, or think that you have already had one too many. Chances are, your "snakes" are only a flock of flexible containers caught in the act of transporting their liquid cargoes quietly, quickly and efficiently from one place to another. At the same time, they will be proving again that "Time Marches On" with the help of rubber and plastics.

"Water, Water, Everywhere . . . "

The question of the availability of water for industrial use has been receiving increased attention as manufacturing plants have multiplied in number and size, and have moved into areas which were once strictly urban.

While it is unquestionably true that there is no overall lack of water in the United States now or in the foreseeable future, it is equally true that there is a temporary or permanent shortage of water in many areas. Efforts continue to provide water in given locations by cloud seeding or by impounding run-off water in reservoirs. There are also intensive studies underway on the practicability of adding to the available water supply by treating sea water by evaporation, distillation, freezing or ion-exchange procedures. Whether any of these methods will ultimately be put into commercial use will depend largely on the economics of the given situation.

Kenneth J. Soule

► Kenneth J. Soule recently retired as manager of the Manhattan Laboratories of the Manhattan Rubber Division of Raybestos-Manhattan, Inc., Passaic, N. J. A graduate of the University of Washington, cum-laude, Mr. Soule started with the firm as a chemist in 1919 after serving with the Chemical Warfare Service in World War I. He has worked extensively on transmission and conveyor belt development and has helped to adapt new synthetics and other materials into its processes. He also helped to build the Manhattan Laboratories. Mr. Soule is a member of Phi Beta Kappa and Phi Lambda Upsilon Honorary Chemical Society. An active member of the A. C. S., he was chairman of its New York Rubber Group for one term.

As Soule Sees It (cont'd)

In this connection, an item in the daily press dated December 29, 1958, announced that the Carrier Corp., Syracuse, N. Y., had been granted a $50,000 government contract to build a pilot plant for the conversion of salt water into fresh water by a direct-freeze process. The pilot plant is expected to produce about 15,000 gallons of fresh water a day and is scheduled to be in operation by the summer of 1959. If the pilot plant proves to be successful, it is expected that consideration will then be given to the construction of a plant with a capacity of "several hundred thousand to a million gallons of water a day."

Another angle of this problem has been investigated in a survey made by Ernest F. Gloyna of the University of Texas for the Bureau of Reclamation. The study covered the present and projected consumption of water in the Texas Gulf Coast industrial area, which includes a large number of manufacturing plants in the chemical, metal, paper, petroleum, food and textile industries. Emphasis was placed on the possibility of re-using so-called waste water by either re-circulation, reclamation or a similar method. It was also pointed out that in view of the increasingly critical nature of the problem, it behooves *all* industrial management to give serious thought to the matter of water conservation and re-use in their own plants, since the shortage is not going to solve itself and will automatically get worse before it gets better.

Although the survey included only a relatively small industrial area, it is quite likely that the average water needs of the unrelated industries covered, are not too different from those of typical rubber and plastics companies in other parts of the country.

Another facet of this problem involves the possible choice of another material to replace water used for industrial cooling. In the past, where process cooling was the main problem, water was traditionally chosen to bring about the required reduction in temperature. Now, however, engineers in such widely diversified industries as Standard Oil (Ohio), DuPont, Esso Research and Engineering and Celanese Corp. of America have found that in a great many cases, air is a more economical coolant than water.

While the choice between air and water for cooling purposes depended largely on the exact problem involved, air often proved to be the winner both on the price of original equipment and the cost of operation. Of course, the emphasis here, was on economics. However, where water conservation is of vital importance, there can hardly be a surer way to save water than by not using it, especially if air will serve as well or better.

Department of Obscure Information

Although I certainly don't claim to be a rocket expert, a recent item in the technical press made me wonder whether or not someone was spoofing. A photograph purported to show the fourth stage of a Pioneer rocket being fitted up and put into place by scientists who were wearing medical masks, gowns and rubber gloves. In the accompanying release, it was stated that the rocket had been sterilized "to prevent contamination of the moon," in case the vehicle collided with it.

First, it was far from clear just what kind of contamination we were trying to keep from spreading on the verdant face of the moon or why the reputedly high surface temperatures generated by the passage of a rocket through inter-stellar space would not in themselves sterilize the surface of the rocket. In other words, from the very brief explanation given, the whole idea seemed slightly ridiculous.

Since then, however, I have been privileged to discuss the matter with men who are quite conversant with rocketry, and they explain the matter rather logically. According to their views, one of the first things we would want to do upon contact with the moon would be to sample its surface, its atmosphere, its microorganisms, etc. Of course, it would be vital that these factors would not be altered or destroyed with anything brought in by the rocket.

Apparently, the sterilization of rocket surfaces and probably the inner parts as well, is an integral part of launching operations. To me, this not only clarifies a misconception, but is another testimonial to the elaborate precautions which our scientists are pursuing in their space probes. More power to them!

Blood Vessels Made To Order

Replacement of diseased or defective blood vessels in the human body has engaged the attention of surgeons all over the world for a great many years. The first successful operations along these lines probably took place about 50 years ago. They involved replacement of diseased blood vessels by healthy blood vessels from the patient himself or from another individual.

Later on, many synthetic materials were suggested or tried instead of natural arteries. Among these were glass, various metals, methyl methacrylate and polyethylene. None of these were particularly successful. In fact, their use, as well as the use of rigid implants, has been almost entirely abandoned.

Utilization of arteries fabricated from flexible synthetic substances has been much more satisfactory and a number of materials have been found which have the necessary properties for such usage. These requirements include high tensile strength, low porosity, extremely good chemical resistance, and, of course, compatibility with body tissues. Obviously, tubes made from the chosen material must also be easy to sterilize and store for immediate use.

Although there is apparently no complete agreement among surgeons as to which material is best for use as artificial arteries, the choice at the moment seems to be limited to nylon, "Teflon," or "Dacron." The exact choice made depends on the situation involved and, no doubt, on the availability of synthetic tubes of the desired sizes, wall thicknesses and construction.

In any case, the superb teamwork between manufacturers of the basic raw materials, fabricators and vascular surgeons has already saved the lives of thousands of persons with defective arteries and will continue to bring hope and relief to other sufferers. Improvement in the mechanics of small diameter tube preparation and use may well spread the benefits of this type of surgery to cases where it cannot now apply.

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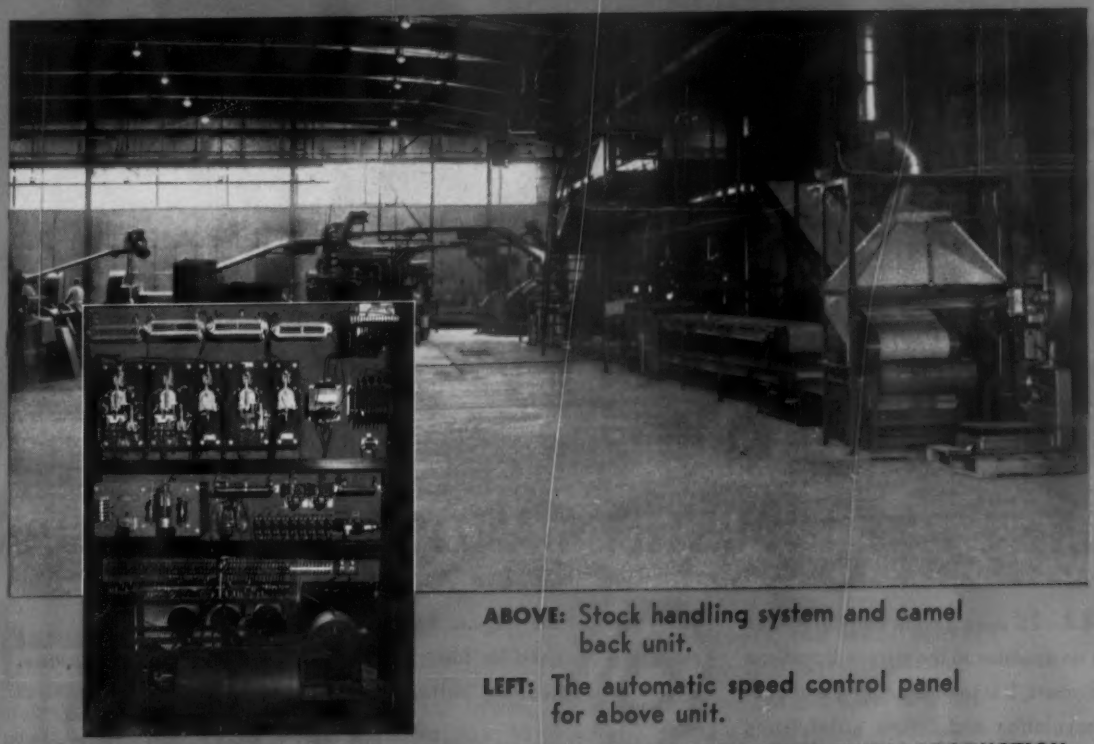

ABOVE: Stock handling system and camel back unit.

LEFT: The automatic speed control panel for above unit.

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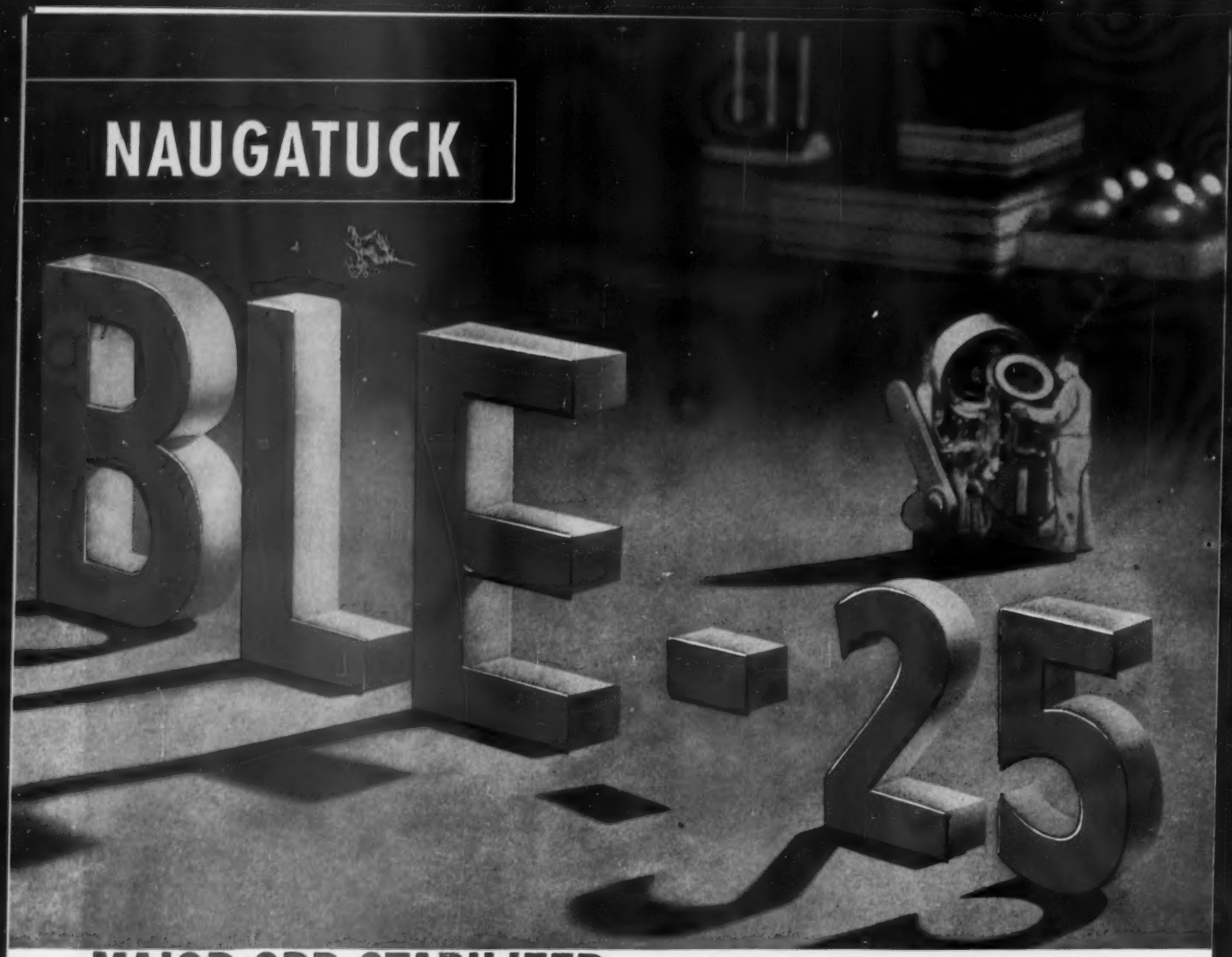

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RUBBER AGE/Vol. 84, No. 5/February, 1959

The Future of Natural Rubber

By JOHN McGAVACK

Former Technical Director,
Plantations Division,
U. S. Rubber Co., New York, N. Y.

The outlook for natural rubber has never been brighter . . . production costs, the labor market and technological advances—particularly chemical stimulation of the trees to increase yields—are working in its favor

THE FUTURE of natural rubber has never been rosier. Its existence and use will continue as long as it is necessary and desirable for human hands to do manual labor. Even in the millennium it is unexpected that natural rubber will be eliminated. These are bold words, but it is believed that the present development of commercial rubber products fully justify them.

Paradoxical as it may seem, the introduction of synthetic rubber has been a boon of great value to natural. It has provided sufficient hydrocarbon to increase the wide use of rubber without causing the price of natural rubber to fluctuate so widely as to make a rubber company within a few months period either a prince or a pauper. Today, thanks to the wonder development of synthetics, there is enough rubber and elastomers to go around, with the result that the price of rubber can remain relatively stable. This is the reason, more than all others, why during the last twelve years almost all rubber companies have shown a profit margin. They have had plenty of material of a wide variation in properties to choose from, and have not had to combat widely fluctuating raw rubber costs.

It is well established at the present time in the elastomer field that about thirty per cent of the production requires natural rubber regardless of cost, and about thirty per cent requires the synthetic type. The

JOHN McGAVACK, recently technical director of the Plantations Division of U. S. Rubber Co., is well known to the rubber industry for his many years of service as chairman of the Bibliography Committee of the Division of Rubber Chemistry, American Chemical Society, and as a research chemist in the General Laboratories of U. S. Rubber Co. Dr. McGavack was born in Waterford, Virginia. In 1913 he received the A.B. degree from Hampden-Sydney College, and in 1920 the Ph.D. degree from Johns Hopkins University.

Dr. McGavack has been active in the latex field, and many U. S. patents have been issued in his name. He was also instrumental in the establishment of the modern "split level" greenhouse at his company's research center at Wayne, N. J. In his capacity as chairman of the Bibliography Committee, Dr. McGavack has been responsible for carrying forward the preparation and editing of the "Bibliography of Rubber Literature."

balance, or forty per cent of the production, can use either depending upon its cost. This percentage holds even if the newer synthetic types which are quite similar to natural rubber are taken into consideration. This statement means then that for many applications natural rubber will be used just so long as it can be prepared at a cost cheaper than an exact similar synthetic type.

To a great extent then the survival of natural rubber will depend upon the technical fact of whether a synthetic variety similar in all characteristics can be synthetically made at a cost as cheaply as natural can be grown. This then is the sixty-four dollar question. It is believed with a few minor exceptions that the first part of this criterion can be answered in the affirmative—witness the synthetic types known as Coral *(1)* and Ameripol SN *(2)*.

As to cost, the figures so far available indicate to this writer that such a synthetic material will always be higher than the natural. There have been reports that such a material could be commercially produced for $1.00 per pound; there have been other reports saying that the cost could be pared to 60 cents a pound; there have been other still more optimistic reports stating that in large quantities a suitable counterpart of natural could be produced for 36 cents a pound. All of these figures are higher, and some considerably higher, than the cost of natural rubber is ever likely to be. It is completely unexpected that the lowest cost mentioned above will in the future be reduced.

This last statement appears reasonable because of the nature of the raw materials used in the manufacture of synthetic rubber, which takes into consideration the expensive nature of the required catalysts. Such monomers and catalysts, however, are cheaper than similar substances employed by the Hevea tree in producing rubber would be if they had to be purchased. This is indicated by the unpublished work and ideas of Faulks *(3)* and the rather considerable amount of government financed research emanating during 1945 to 1951 from an excellent team of workers at Cornell University studying and scrutinizing how the formation of rubber is brought about in the plant itself. The systems is not simple and would be expensive.

Cost of Natural vs. Synthetic Rubber

Let us look at another phase of the problem. In the preparation of natural rubber practically all of the ingredients that go into the production are free —carbon dioxide of the air; mineral substances from the leaf drop of the trees; tropical soil areas containing minerals and water; sunlight in quantities more than sufficient to polymerize all the rubber that will ever be needed. In other words, the raw materials are there for the asking.

Contrast the above facts with what is needed when a synthetic is made. All of the raw materials have to be purchased at a relatively high cost—this includes the monomers, the catalysts, the short-stopping agents, the dispersing agents, or in fact everything which goes into a synthetic preparation. This also means that such materials used for rubber will deplete our natural reserves—a fact at the moment not important, but one that eventually will have to be reckoned with.

Let us give a little thought to the capital outlay necessary in each case. Perhaps the best information on the cost of a modern synthetic plant is given by Chilton *(4)* in a recent article. Here a complete description with costs is found for the up-to-date factory which manufactures the best type styrene rubber. Without going into details, it is stated that $10,000,000 is required to construct a plant which will produce 40,000 tons of synthetic rubber per year. These figures show then that an initial investment ment of $250 must be made for every ton of rubber to be produced each year provided a 40,000 ton plant per year is built. Apparently, this size is the one that can be constructed most economically.

The modern rubber plantation if started from scratch at the present time would produce more than a ton of rubber per acre per year when it reached maturity. The cost of bringing rubber into bearing is estimated at about $500 per acre. This is about twice the capital cost shown above required to produce a ton of synthetic. However, at the present selling prices the profit on a ton of natural is more than that on the same amount of synthetic. It is also felt that the life of a plantation is about twice as long as that of a well-constructed synthetic plant. It would appear over a long period of time that the relative capital cost for a synthetic plant and a plantation are about the same.

At the present time the actual labor cost of plantation rubber is greater than that of synthetic. This is mainly due to the much larger number of laborers employed per unit of production on a plantation than is necessary in a synthetic plant. However, at the present time—and probably for a long time in the future—the rate of pay for hand labor will be considerably lower on a rubber plantation than it is in a synthetic plant.

To partially overcome this greater use of hand labor the modern plantation will be organized on a somewhat different basis from that of the present arrangement. For example, at present a lot of time and labor is used to carry the latex from the field to the collecting station. This is mainly due to the present low yield where many trees have to be tapped to produce a reasonable amount of rubber. When new high yielding clones are introduced, motor pick-up trucks can be used in the field. Such collection procedures will allow the tappers to put more time on tapping and less on carrying latex to the central station or factory. This will be especially helpful where long drip times are required and two emptyings of the tapping cup may be needed.

It is doubtful but still in the realm of the imagination that mechanical tapping may at some future date be possible. However, other methods of reducing hand labor are constantly being initiated; for example, use of cover crops, strip weeding, mechanical strip weeding, mechanical cultivation, use of weed killers and other modern agricultural manipulations.

Future Yield Can Be Multiplied

The dividend handle in the preparation of natural rubber is tremendous. By this I mean that the usual yield per acre that now exists can be multiplied by a large factor. In other words, it is not only possible but realistic to say that right now by proper replanting the yield of rubber per acre can be increased many times.

Let us consider these facts. Rubber estates planted many years ago produce now about 375 pounds per acre; a well-managed average estate that has been cultivating rubber for a long time should have a production level of about 750 pounds per acre; this same well-managed estate will be looking forward to increasing yields per acre as the years go by because such an estate will be replanting with higher yielders each year; there are now well tested clones which in their prime yield as much as 1800 pounds per acre per year. In other words, it would appear that increased yields will outstrip increased labor costs. It is expected, and to some extent realized, that further intensive breeding will produce still higher producing clones.

Another feature that cannot be overlooked is the fairly recent but considerable amount of nutrition work now being carried on in all rubber plantation countries and other research centers equipped and interested in rubber nutrition. This work has taken a real scientific approach to the subject, and is not a hit-or-miss application of a few nutrients here and there to low yielding areas. It has been directed in tying together the natural fertility of the soil with the actual mineral content of the rubber tree itself, and more particularly with the leaf of the tree. It has meant a vast number of complete leaf and soil mineral analyses, and will mean many more in the future. These recent intensive studies show how, what kind and how much fertilizer is needed in what spot. It will change a hit-or-miss method to one of exactness.

A tapped rubber tree with latex flowing down into the cup in which it is collected. This symbol of the natural rubber industry will remain as long as it is necessary and desirable for human hands to do manual labor.

A preliminary and rather broad exposition of such methods was published by Rhines, McGavack and Linke *(5)* in early 1952. This work has been extensively followed up in the field with excellent results indicated. The outstanding work of Bolle-Jones *(6)* and his co-workers in the last five years has contributed greatly to the thorough understanding of rubber mineral nutrition. Also the work of Beaufils *(7)* in Indo-China has helped put this approach to increased production on a sound footing. There is much other work that could be mentioned, but which cannot be reviewed in this short sketch. Surely rubber growing will be greatly benefited by such studies.

A New Technical Development

In addition to these notable strides in the breeding and nutrition of natural rubber that has been carried on over the last 35 years, there is another technical development of great importance which is on the threshold of being put into large commercial use. This development is known as stimulation—which indeed is a very good term to describe what happens. In fact, I would like to suggest the name of catalytic stimulation. The reason for such a definition is that the method requires a very small dose of particular chemicals applied at infrequent times to bring about tremendous changes in the yield of the rubber tree. Actually a few milligrams of the right chemicals applied to each tree twice a year has a decisive effect. After 12 years of experience it would appear that such treatments not only do not have a harmful effect

Chemical stimulation of the rubber tree as practiced in Sumatra. Small doses of chemicals applied at infrequent intervals bring about tremendous changes in the yield of a tree.

upon the rubber tree, but actually improve its health pattern. Twenty-five to forty per cent increased yield can be obtained by this method—all at an insignificant expense.

This method is not an old-age monkey gland treatment entirely for the use of trees far beyond their prime. True, it is excellent for such trees and greatly aids in their continued health and usefulness. However, this method—stimulation—can be applied with great success to trees producing in their prime; it can be applied to seedlings and buddings alike; it can be applied even to young trees which have just been brought into tapping.

This last practice still needs some further commercial proving before extensive use. The question of the growth of the tree is also involved. The rate of growth of a rubber tree in its early years as obtained by girth measurements and plotted against time is almost a straight line function. When tapping begins and rubber is removed, the growth curve bends over to the time axis. As stimulation removes more rubber, is would be expected to retard growth to some extent. This actually happens. Thus, it is indicated considerable thought must be given in stimulating young rubber trees. There are many factors involved, but perhaps a simple rule would be not to stimulate until the crowns of the trees in the area completely shut off the sunlight.

I have no desire to completely give or analyze all the data pertaining to stimulation. That is a long story and would require considerable space to give all the exhaustive details. I do want, however, to describe several crucial experiments that quite clearly demonstrate my points. It also might be helpful to outline more clearly and in simple words just what is done when rubber trees are stimulated.

How a Tree Is Stimulated

Without going through all the preliminaries it seems that current or present day stimulation had its origin in the plantation division of the French Institute in French Indo-China. One of the early substances used, and which is still used, especially in that area, is copper sulfate. It was found that by boring a hole about one-half inch in diameter near the tapping cut and introducing into that hole 5 to 10 grams of copper sulfate, that the flow of latex was greatly increased when the tapping cut was opened. Of course, after the introduction of the copper salt, the hole was completely filled with an inert material and then sealed by various means in order to protect it from the rain.

Development and refinement of this method has been made so that consistent increased yields of from 20 to 30 per cent were accomplished even with long intervals between the injections of the copper sulfate and even after long periods of tapping. Although this method has some merit, it does require slight mutilation of the trees and also there is a good chance of copper being introduced into the latex in cases where laxity occurs.

It is believed that there might also be some risk when a slug of copper sulfate is introduced into the tree below the cambium, but it is not believed that much trouble would result from spilling the substance on the soil. Experiments on record indicate that excess copper in the soil will kill the tree before it will find its way into the latex system. Copper sulfate or some similar substance may prove the right answer for stimulation of latex flow, but right now it would appear that other substances are more promising.

There is a wide number of chemicals that have been shown to be stimulants. The greater part of such substances are found among those chemicals which are recognized as plant growth promoters. Actually, the two that have had the widest use so far are 2,4-dichlorophenoxy acetic acid and 2,4,5-T-trichlorophenoxy acetic acid with shortened titles of 2,4-D and 2,4,5-T respectively.

These two materials are generally used as weed killers and work on the principle of making the plant grow so fast that it kills itself. As a sidelight, these substances when properly applied to the rubber trees, if anything, retard the growth for the reason noted above. Hence it is unexpected that they would hurt the tree due to too rapid extension of its structure. It could be argued that so long as the growth continues, but at a slower rate, that the life of the tree would be longer and its latent strength greater. However, these surmises are yet to be completely proven.

Just what the mechanism of increased rubber flow is is still debatable. Let us bear in mind that these rubber hormones have their positive effect independent of the part of the tree to which they are applied—leaf, bark or tapping panel. I am inclined to believe it has something to do with relaxing the latex vessels, preventing them from closing at the tapping cut as soon as if no stimulant were added. It might in its activity be likened unto the use of auxin in all plant life.

Following this thought up, as more latex pours out of the cut vessels more is drained from the more remote sections of the bark. If this is so, then the latex and latex substances in these areas will be diluted and the law or replacement will be exercised. It might be like any chemical reaction when one removes one of the constituents as the end product. The reaction shifts to the right causing more of the end-product—in this case rubber—to be formed.

Another possibility advanced with some good evidence by Archbald *(8)* is that the hormone acts as a catalyst and actually causes the formation of more rubber immediately throughout the plant. This idea certainly has merit and undoubtedly will be given further consideration. Wiersum *(9)* in 1955 summarized the situation as given in *Rubber Abstracts* somewhat as follows: "No indications were found of exhaustion of the tree as a result of stimulation. It is postulated that the local application of hormone increases respiration rate and this leads to an increase in the rate of flow of latex and its regeneration". Certainly the mechanism is such that more rubber is obtained, and it might be that there is a combination of these several hypotheses at work.

The Rubber Research Institute of Malaya has also done a lot of work in exploiting the use of stimulants. I would like to draw from a recent synopsis of their work. It is found in the *Planters' Bulletin (10)* and I would especially direct you to Table II of that article. The work relates mainly to the stimulation of unselected seedlings. Data from this article are given with a few added notes in the accompanying table.

In addition to this, I would like to quote one sentence from this report which says: "It is known that high yielding clones tapped one-half spiral every other day react favorably to yield stimulation. The method is most advantageously used when high tapping is done, but full advantage should be taken of the period of flush yield after opening the high cuts before applying the stimulant. Thereafter, stimulant applications may be made at half yearly intervals."

Stimulation was done in these experiments by 2,4,5-T mixture. The spiral tapping was on a low cut, the V tapping on a high cut. In items 2 and 5 stimulation

Four-year-old budded rubber trees in Malaya. Technological advances, including chemical stimulation, indicate that greatly increased yields can be expected from such stands.

was applied on a three-inch strip of bark below the cut. In items 3 and 6 the stimulant was applied on the panel above the cut. In the case of 2 and 3 the stimulant was applied every six months, but in the case of 5 and 6 it was applied every month.

Certainly good and consistent results are noted in these experiments from the use of a stimulant. It is noted that in all of the five periods using the same tapping procedure the percentage increase caused by stimulant is approximately the same.

From the records of my own company *(12)* I would like to give a few figures. On a block of old seedlings planted prior to 1920 and an equal number of trees in the same area have been tapped continuously for three years. One section was stimulated with 2,4-D and the other section was not stimulated. The stand in each section decreased during the three year period to about the same extent because of the age of the trees. The actual yields are as follows:

Time, Years	Contol Area, Pounds	Stimulated Area, Pounds	% Stimulated/ Control
3	4958	7875	158

In another experiment which is crucial, designed by my former co-worker Archbald *(13)*, an area of

Stimulation of Unselected Seedlings Planted in 1929

	Mean yield in grams per tree								
	First 6 mo. period	Second 6 mo. period	Third 6 mo. period	Fourth 6 mo. period	Fifth 6 mo. period	Whole 2.5 years	Yield, (%)	Yield, lb./ tree	Yield,* lb./ acre
HALF SPIRAL CUT TAPPED ALTERNATE DAYS									
(1) No Stim.	20.6	17.5	20.8	22.3	20.7	20.4	100	7.7	460
(2) Bark Stim.	23.8	21.1	26.3	24.8	22.3	23.7	116	8.8	538
(3) Panel Stim.	24.4	22.0	24.3	26.5	23.1	24.0	118	9.2	545
HALF V CUT TAPPED ALTERNATE DAYS									
(4) No Stim.	20.2	16.2	17.7	14.9	15.9	16.8	100	6.4	384
(5) Bark Stim.	32.9	26.1	26.9	20.2	22.9	26.0	154	9.8	586
(6) Panel Stim.	28.6	21.0	20.9	17.6	21.3	21.9	131	8.3	495

*Based on 170 tappings per year and a stand of 60 trees per acre, (not unusual for trees planted in 1929). The last three columns of this table were worked up from data given by the author of this paper.

A worker tapping a tree to obtain its valuable latex. Vastly increased yields enable the producer to pay a higher wage scale and still make a profit.

thirty acres of mixed buddings planted in 1939 was given a special stimulation test. The area had been producing at the rate of 1100 pounds per acre and was stimulated with the best technique known at that time. However, the stimulation was not done every six months as has been the general pattern, but was applied every six weeks for the last three years. The results after this period of experimentation was 39 per cent increase in yield without any noticeable harm to the trees. The actual figures for one of these years are:

Time, Years	Control Area, Pounds/Acre	Stimulated Area Pounds/Acre	% Stimulated/ Control
1	1050	1440	137

This is a remarkable and illuminating experiment. Its importance is not so much that there was a tremendous increase in the yield, but that the stimulation treatment applied for three years every six weeks instead of every six months did not harm the trees. This gives excellent insurance that stimulation is here to stay, and will almost definitely ensure the production of natural rubber at a price considerably lower than any similar synthetic. Stimulation will be a real boon to the production of natural rubber.

Implications for the Industry

What do these facts mean? They mean that a would-be producer of natural rubber can plant today and instead of turning up with a plantation that will produce 400 pounds of rubber per acre each year he can expect a return of 1800 pounds per acre each year. Furthermore when this 1800-pound yield is realized, he can apply stimulation in a modest way and expect 2350 pounds per acre. This is almost a six-fold yield, and will enable the producer to pay a higher wage scale and still make a profit.

There are many hundreds of thousands of acres that are available for this job. Consider the open spaces in the Far East in such countries as Indonesia and Malaya; consider the vast tracts north and south of the equator in Africa; consider the areas now available in South America (the deadly leaf blight disease has now been overcome). All of these places are ideal for natural rubber. They have the sun, the soil, and in most places, a fair amount of labor. We could change that old saying of "Go West" to "Plant Rubber".

But pause—it is not quite that easy. If everybody planted a lot of rubber all at once, there would be an over-supply like the one we would have if too many people planted too much wheat or corn, or if too many built too many and too large synthetic plants. A venture into the preparation of either type must be predicated on the over-all demand for rubber.

Undoubtedly, that demand will increase—it is believed that for the next decade this increase will be quite steep—and for that reason more plants of both types will be needed. Certainly in the natural rubber field, unless there is extensive replanting of old rubber as well as new virgin ventures, we will in the very near future not have enough God-made rubber available.

What I want to say is that natural rubber has a use all its own. It seems reasonable that it cannot be supplanted by a synthetic variety of the same caliber which is at the same time as low in cost. Natural rubber can be prepared cheaper than a synthetic of similar characteristics; it will help take up a labor supply that for many years to come will be available; it will not reduce our natural resources; it will help keep that vegetation balance that is so essential for the welfare and existence of this world of ours. Do not sell natural rubber short.

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a paint applicator for

Coloring Wire Jackets

By S. VICINO, Jr.

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ELECTRONIC controls in connection with automation and other modern industrial processes require a multitude of circuits. This has resulted in the use of a greatly increased number of colors both for insulations and jackets for identification purposes. In order to meet this demand, it became necessary to devise an economical method of producing a satisfactory product for this purpose.

The objective of the study reported here was to develop a process to displace the material and time-consuming operations involved in circuit and phase color coding by the conventional methods of blending and mixing pigments in the primary insulation, as in the case of thermoplastic compounds, or in jacketing, as in the case of both thermoplastic and thermosetting materials.

It was found that the desired results are easily obtained by a surface coating of colorfast and durable films, involving a minimum of change-over time from one color to another, and entirely eliminating the arduous tasks of cleaning out tubers and extruders. The method of application is so simple that an unskilled operator can set up the necessary equipment and run the operation in a fraction of the time formerly required.

Color-coding on both thermoplastic and thermoset-

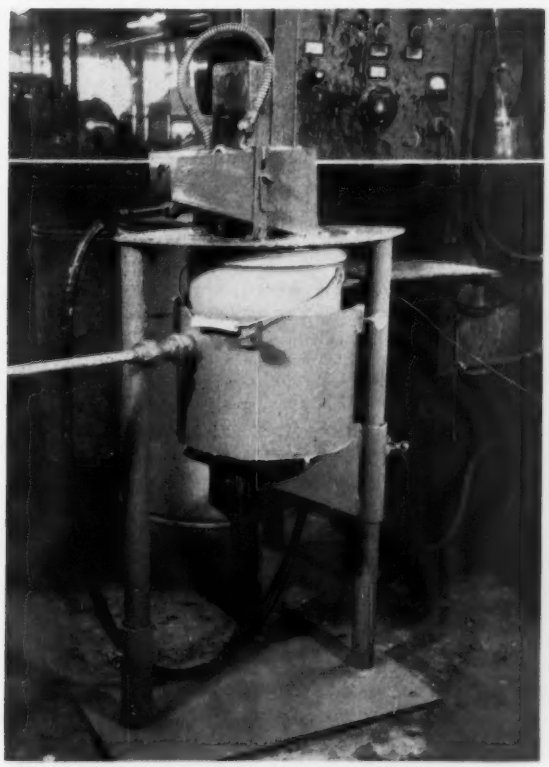

FIG. 1—Pump type paint applicator in the process of coloring the surface of a jacketed wire as it leaves the extruder. It is approximately two feet from the extruder head.

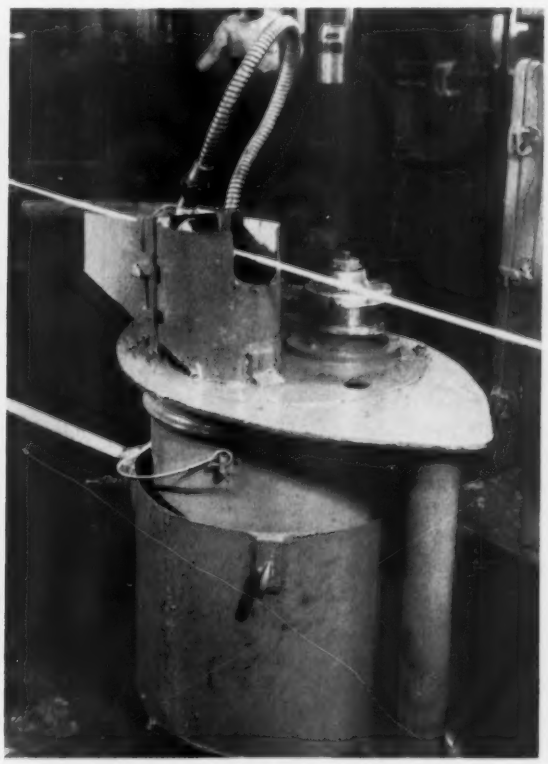

FIG. 2—Closeup view of the applicator. Change of color is easily achieved simply by replacing the pail with another containing a differently colored paint.

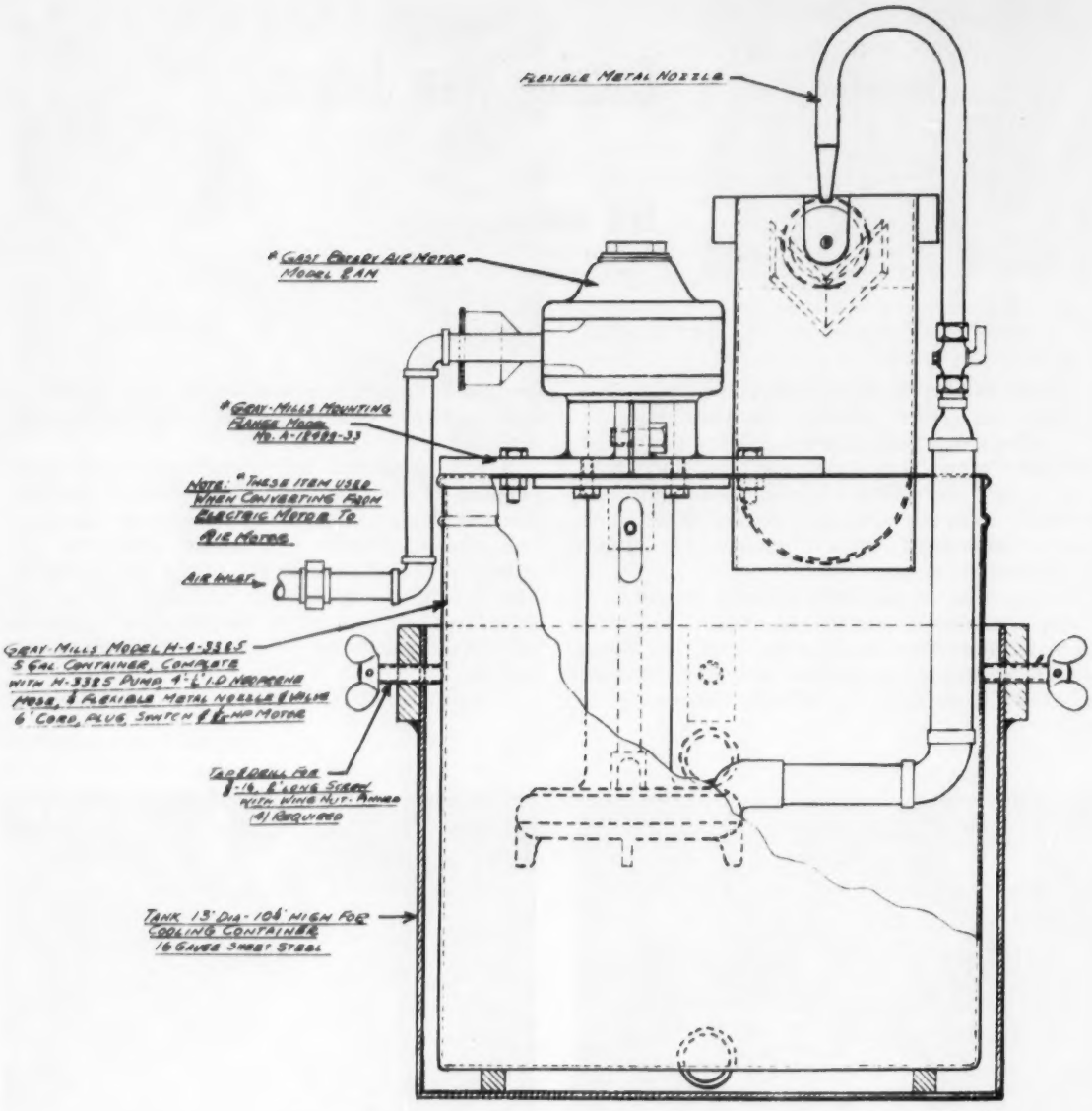
FLEXIBLE METAL NOZZLE
* GAST ROTARY AIR MOTOR MODEL 8AM
* GRAY-MILLS MOUNTING FLANGE MODEL NO. A-1999-33
NOTE: * THESE ITEM USED WHEN CONVERTING FROM ELECTRIC MOTOR TO AIR MOTOR.
AIR INLET
GRAY MILLS MODEL M-A-3385 5 GAL CONTAINER, COMPLETE WITH M-3385 PUMP 4'-6" I.D NEOPRENE HOSE, & FLEXIBLE METAL NOZZLE & VALVE 6' CORD, PLUG, SWITCH & 1/2 HP MOTOR
TAP DRILL FOR 5/16-18 LONG SLEEVE WITH WING NUT. PLATED (8) REQUIRED
TANK 13" DIA - 104" HIGH FOR COOLING CONTAINER 16 GAUGE SHEET STEEL

FIG. 3—Diagrammatic drawing of the pump type paint applicator.

ting type insulations by this method has been thoroughly evaluated by laboratory and field tests, and has the approval of the Underwriters' Laboratories and Canadian Standards Association.

Color Coating PVC

Figures 1 and 2 are photographs of a pump type paint applicator, and Figure 3 is a detailed drawing showing its construction. The air motor and injector head are connected to the cover of a five gallon pail which holds the paint. When it is desirable to make a color change, the cover is removed from the pail which is replaced with one containing another paint. Thus, it only takes a few minutes to change from one color to another.

The paint applicator is stationed approximately two feet from the extruder head. A rubber nipple, which has previously been burned out with a hot drill rod slightly less than the diameter of the insulated wire, is attached to the applicator head. Wire is then strung through the applicator head and nipple wipe, and the pump is turned on while the operator commences to take center on his insulation. It is important not to allow any dry plastic to go through the rubber nipple, as it will destroy the nipple by friction. When centering has been obtained at low speed it is necessary only to bring up the extruder to the desired production speed and a uniform coating of color will be obtained.

There are no limitations in regard to speeds at which the wire may be color coated. If it is desired to print during this operation, a printing machine can

be stationed approximately three feet from the wiper nipple. By keeping extruders loaded with a white or neutral compound and surface color coating, the problem of stocking various color compounds is eliminated. If the manufacturer's present operation is to stock a white compound and to mix in color chips, the paint applicator also eliminates this procedure.

The major advantages of surface color coating are: (1) There is no necessity for a large build-up of bleeder stock, which must be granulated and segregated prior to reextrusion; (2) Extrusion equipment is flexible from the standpoint of being able to run colored wires as per orders by customers, eliminating the necessity of a large stock inventory of wires in different colors, and (3) When using a white or natural compound, uniformity of electrical and physical properties is maintained.

The application techniques for color coating polyethylene are the same as those used for color coating PVC with one exception, and that is utilization of polyethylene impregnant solution in place of the plastic coating.

Color Coating Neoprene

In color coating neoprene, when the wire leaves the pay-off reel, it is guided through the open flame of a Bunsen burner. Its function is to heat the neoprene and to retard any blooming of plasticizers. Immediately, thereafter, the wire receives two coats of neoprene coating. After the wire air dries for approximately 20 feet, it can then be printed if desired, and waxed, and then it goes into water troughs to cool to room temperature.

If one is color coating neoprene wires that are not in the circular mill sizes, the water troughs may be eliminated providing that there is water around the capstan wheel, which would give sufficient cooling prior to taking the wire in on the take-up reel. When color coating wires in the circular mill sizes, it is recommended that two burners be used in a V-shape, which will give sufficient heat to the complete cable, and that the water troughs be used to cool the cable down to room temperature. When color coating neoprene wires with this set up, there are no limitations in regard to speeds at which the wire may be processed.

Here again, the advantages of surface color coating rather than solid pigmentation are very obvious. Elimination of the mixing of various color rubber compounds is foremost. Also eliminated is lost time brought about by stopping the C.V.'s for cleaning. Further, no longer is wire lost in the C.V. tubing due to changing from one color to another. From the physical standpoint maximum physical properties are obtained by utilizing a black neoprene and surface color coating.

The set-up required for color coating neoprene can also be utilized for color coating PVC on a second operational basis. When color coating plastic by this method, only one paint pot is required in order to obtain complete coverage of a white compound.

Although the various coatings and techniques were primarily developed for the surface color coating of wires and cables, this process can also be adapted to any shapes or forms of plastic, polyethylene and neoprene which are extruded, such as tubes, rods, flat sheet and similar products.

Coming Next Month . . .

Identification of Carbon Blacks by Centrifugation and Spectrophotometric Measurements — By A. Fiorenza, Rubber Laboratories, Pirelli, S.p.A., Milan, Italy

Description of a method designed to overcome certain limitations of the spectrophotometric technique for identifying carbon blacks in rubber.

Post-Inflation: A New Technique for Making Nylon Tires—By C. G. Wyman, Dayton Rubber Co., Dayton, Ohio

A new method of manufacture helps check common types of damage such as cuts, ply separation and tread cracking.

Liquid Urethane Elastomers—By R. J. Athey, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

Compounding information on a class of elastomers which offer a means of making high-quality rubber goods by potentially low-cost processing methods.

PLUS A R/A SPECIAL INDUSTRY REPORT

How to Handle Employee Grievances

A simple formula the plant manager can employ to take the grief out of grievances.

How Hot Water Affects Elastomers

A study which indicates that curing silicone rubbers by gamma radiation makes them less susceptible to reversion

By ROBERT HARRINGTON

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THE OPERATION of many nuclear reactors requires the use of vast amounts of water for cooling. The temperature of this cooling water depends upon several factors which are dependent on the type of reactor and operating conditions. One problem which is continually confronting design engineers is the containment of this cooling water, especially when the temperature is relatively high. This condition is also prevalent in other industries, such as the automotive manufacturing business.

The problems arise at the higher water temperatures because many of the elastomers used for various types of seals are badly damaged by hot water, particularly in sealed systems. It is desirable to use rubber materials of construction because they offer economical and efficient means of containing the water.

The work reported here constitutes a portion of an over-all program which is underway to screen for the most promising elastomeric materials of construction for use in various deleterious environments. The information presented here is useful both as engineering data on the resistance of elastomers to hot water and as background information when work will be carried out at different pressures and in combination with various environments, such as radiation.

Materials Evaluated

The materials used for the water immersion studies comprise two groups: those which have been described in previous articles *(1-4)* by the author, and those which are presented here for the first time. This latter group is listed in Table I in accordance with the general chemical type of the base polymer used in each material, and where possible, a brief description is given. Materials which are not proprietary items are described more fully in Table II, which gives recipes and cure schedules. This table also includes descriptions of certain silicone rubbers which were either radiation "treated" or radiation cured in an attempt to improve their resistance to immersion in high temperature water in sealed systems.

Experimental Procedure and Results

The studies reported here were designed to screen elastomers for high temperature water service by initially immersing them in boiling water for 1000 hours. The most promising of these materials were then examined for different periods of time at water temperatures up to 175°C.

Boiling Water. It was decided, for the boiling water tests, that there would be no preferential selection of materials for study. That is, any and all available elastomers would be subjected to this test even though preliminary information on a material might indicate poor suitability for such a test. From this approach, it was hoped that additional information on the materials would be obtained from comparisons within a class where a wide range of water resistance was indicated. The samples—discs .750-inch in diameter by approximately .075-inch thick—were boiled in reflux

TABLE I—ELASTOMERS USED FOR WATER IMMERSION STUDIES

Material Supplier and Designation	Type or Description (Post Cure)
ACRYLIC	
Precision Rubber Products Corp.	
PR 1213-70	A proprietary material.
CHLOROPRENES (Neoprenes)	
DuPont Elastomer Chemicals Dept.	
Neoprene A109D-87*	Neoprene Type GN polymer used.
Neoprene A109D-88*	Neoprene Type GN-A polymer used.
Neoprene A109D-89*	Neoprene Type GRT polymer used.
Neoprene A109D-90*	Neoprene Type W polymer used.
Neoprene A109D-91*	Neoprene Type WHV polymer used.
Neoprene A109D-92*	Neoprene Type WRT polymer used.
FLUOROELASTOMERS	
Minnesota Mining and Mfg. Co.	
Kel-F Elastomer 5500-72	Copolymer of trifluorochloroethylene and vinylidene fluoride.
Westlake Plastics Company	
Kel-F Elastomer 5500-W	Copolymer of trifluorochloroethylene and vinylidene fluoride. A proprietary material.
DuPont Elastomer Chemicals Dept.	
Viton A-7*	Copolymer of vinylidene fluoride and hexafluoropropylene.
Viton A-8*	Copolymer of vinylidene fluoride and hexafluoropropylene.
Viton A-9*	Copolymer of vinylidene fluoride and hexafluoropropylene.
Viton A-10*	Copolymer of vinylidene fluoride and hexafluoropropylene.
Viton A-11*	Copolymer of vinylidene fluoride and hexafluoropropylene.
Viton A-12*	Copolymer of vinylidene fluoride and hexafluoropropylene.
Viton A-13*	Copolymer of vinylidene fluoride and hexafluoropropylene.
Viton A-14*	Copolymer of vinylidene fluoride and hexafluoropropylene.
Viton A-15*	Copolymer of vinylidene fluoride and hexafluoropropylene.
Viton A-16*	Copolymer of vinylidene fluoride and hexafluoropropylene.
Viton A-17*	Copolymer of vinylidene fluoride and hexafluoropropylene.
Viton A-18*	Copolymer of vinylidene fluoride and hexafluoropropylene.
FLUOROELASTOMERS (Cont'd.)	
Precision Rubber Products Corp.	
PR 17107	Viton A polymer used. A proprietary material.
SILICONE RUBBERS	
General Electric Company	
SE-452	Methyl vinyl (24/480).
SE-472	Methyl vinyl (24/480).
SE-482	Methyl vinyl (24/480).
SE-975	Methyl vinyl (24/480).
SE-100	Dimethyl (24/480).
SE-701	Dimethyl (24/480).
81813	Dimethyl room temperature vulcanizing material (16/25).
Dow Corning Corporation	
Silastic S2071 B-2	Methyl vinyl (24/480). Dichlorobenzoyl peroxide cured.
Silastic S2081	Methyl vinyl (24/480). Ditertiary butyl peroxide cured.
Silastic S2096	Methyl vinyl (24/480). Ditertiary butyl peroxide cured.
Silastic S2097	Methyl vinyl (24/480). Ditertiary butyl peroxide cured.
Silastic S2098	Methyl vinyl (24/480). Ditertiary butyl peroxide cured.
Hanford Materials	
SE-371 W-1-R*	SE-371 elastomer cured with peroxide and treated with gamma radiation.
Silastic S2048 W-1-R*	Silastic S2048 elastomer cured with peroxide and treated with gamma radiation.
HW-BA1*	Silastic S2071 compound cured with gamma radiation.
HW-BA2*	Silastic S2071 compound cured with gamma radiation.
HW-BA3*	Silastic S2071 compound cured with gamma radiation.
HW-BA4*	SE-361 compound cured with gamma radiation.
HW-BA8*	SE-361 compound cured with gamma radiation.
HW-BA6*	K-1047R compound cured with gamma radiation.
HW-BA7*	SE-555 compound cured with gamma radiation.

* See Table II for additional information on recipes and/or cure schedules.

condensers for 1000 hours and were studied by recording changes in the following properties:

Hardness. Measurements were made in accordance with ASTM D 676-55T. Unless otherwise noted, all values were obtained with a Shore hardness durometer using the A scale.

Weight. Changes were recorded by weighing the materials to tenths of milligrams (.0000 grams).

Thickness. Measurements were made in accordance with ASTM D 374-42. Changes were recorded by measuring to tenths of mils (.0000-inch).

Flexibility. A 180-degree bend test with positive finger pressure applied to ensure that the specimen sides were in contact and to reduce the radius of bend to a minimum was used to test flexibility.

The above properties were measured on each of two disc specimens one hour after having been removed from the reflux condensers. Each reported

value is the arithmetic average of the two measured values. The results obtained from immersing the materials are given in Table III. This table shows the per cent change in the above properties occurring as a result of exposure to boiling water. In parenthesis beside the hardness changes the original hardness of the various materials is given. Other pertinent phenomena occurring and needing comment are noted under the remarks column. Also shown under the remarks column in parenthesis is a reference which appears at the end of the article and from which a description of the materials not described in Table I and Table II can be obtained.

TABLE II—RECIPES OF ELASTOMERS USED FOR WATER IMMERSION STUDIES

CHLOROPRENES

Cure: 30 minutes @ 307°F.

Recipe Materials	A109D 87	88	89	90	91	92
Neoprene Type GN	100	—	—	—	—	—
Neoprene Type GN-A	—	100	—	—	—	—
Neoprene Type GRT	—	—	100	—	—	—
Neoprene Type W	—	—	—	100.0	—	—
Neoprene Type WHV	—	—	—	—	100.0	—
Neoprene Type WRT	—	—	—	—	—	100.0
Neozone A	2	2	2	2.0	2.0	2.0
Zinc Oxide	5	5	5	5.0	5.0	5.0
Magnesia	4	4	4	4.0	4.0	4.0
NA-22	—	—	—	0.5	0.5	0.5
FEF Black	3	3	3	3.0	3.0	3.0

FLUOROELASTOMERS

Cure: 30 minutes @ 300°F.; post cure: 24 hours @ 400°F.

Recipe Materials	Viton A 7	8	9	10	11
Viton A	100.0	100.0	100.0	100.0	100.0
Zinc Oxide	10.0	10.0	10.0	10.0	—
Dyphos	10.0	10.0	10.0	10.0	—
Litharge	—	—	—	—	20.0
Hi Sil LM-3	25.2	—	—	—	—
Blanc Fixe	—	47.4	—	—	—
Iceberg Clay	—	—	28.4	—	28.4
Super Multifex	—	—	—	28.6	—
HMDA-Carbamate	2.0	2.0	2.0	2.0	2.0

Recipe Materials	Viton A 12	13	14	15	16	17	18
Viton A	100	100	100	100	100.00	100	100.00
Zinc Oxide	10	10	10	10	—	—	—
Dyphos	10	10	10	10	—	—	—
Darlington 601 MgO	—	—	—	—	15.00	15	15.00
Thermax	—	20	40	60	20.00	20	20.00
HMDA-Carbamate	1	1	1	1	0.75	1	1.25

RADIATION TREATED SILICONE RUBBERS

SE-371-W-1-R	SE-371 peroxide cured silicone exposed to 1×10^7 r gamma radiation.
Silastic S2048-W-1-R	Silastic S2048 peroxide cured silicone exposed to 1×10^7 r gamma radiation.

RADIATION CURED SILICONE RUBBERS

HW-BA1	Silastic S2071 uncatalyzed compound cured with gamma radiation to a dose of 6.5×10^6 r.
HW-BA2	Silastic S2071 uncatalyzed compound cured with gamma radiation to a dose of 1.2×10^7 r.
HW-BA3	Silastic S2071 uncatalyzed compound cured with gamma radiation to a dose of 2.5×10^7 r.
HW-BA4	SE-361 uncatalyzed compound cured with gamma radiaition to a dose of 2.5×10^7 r.
HW-BA8	SE-361 uncatalyzed compound cured with gamma radiation to a dose of 1.4×10^7 r.
HW-BA6*	K-1047R uncatalyzed compound cured with gamma radiation to a dose of 2.5×10^7 r.
HW-BA7**	SE-555 uncatalyzed compound cured with gamma radiation to a dose of 2.5×10^7 r.

*See Figure 2 for radiation cured properties of this material; **See Figure 3 for radiation cured properties of this material.

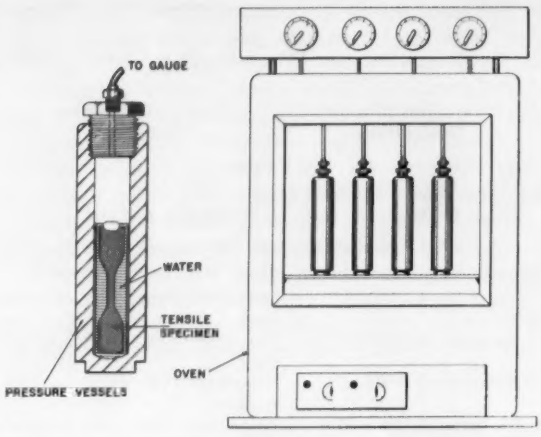

FIG. 1—Equipment used for high temperature water studies.

High Temperature Water. The materials or classes of materials which showed promise as a result of the boiling water tests were further studied by immersing them in high temperature water for various time intervals. Depending upon the material, the immersions were made in sealed pressure vessels at temperatures of 125°, 150°, and 175°C. for 40, 150, 500, and 1000 hours. Figure 1 illustrates the equipment used for these tests. The materials were evaluated by recording changes in the following properties:

Hardness. As described above.

Flexibility. As described above.

Tensile Strength and Elongation. Measurements were made in accordance with ASTM D 412-51T using Die C type dumbbell test specimens and a Scott tensile tester. Original tensile strength and elongation values at the time of break are given respectively in psi and per cent.

The properties were measured on each of two test specimens one hour after having been removed from the pressure vessels. The results obtained are listed in Table IV. This table shows original property values opposite each material identification followed by per cent property changes resulting from various immersions at the indicated times and temperatures. Also shown opposite the material identification and under the remarks column in parenthesis is a reference from which a description of the materials not described in Table I and Table II can be obtained. Other observations needing comment are also listed under the remarks column opposite the particular immersion time for the particular immersion temperature causing the phenomena.

TABLE III—CHANGE IN PROPERTIES OF ELASTOMERS AFTER IMMERSION IN BOILING WATER FOR 1000 HOURS

Materials	Per Cent Change in Properties: Hardness*	Thickness	Weight	Remarks and Literature References	
ACRYLICS					
Acrylon BA-12	1.2(83)	2.7	13.8		(3)
Acrylon EA-5	−16.6(84)	4.0	21.1		(3)
Vyram	−16.2(68)	33.8	57.3	a	(3)
PR 1203-70	− 5.6(71)	41.7	90.5	a	(3)
Hycar 4021	− 1.6(64)	35.1	108.0	b	(3)
PR 1213-70	− 9.6(73)	28.2	48.1	a	
Hycar 2121x26-1	− 9.5(74)	20.5	46.3	a	(3)
Hycar 2121x26-2	−12.6(87)	8.6	20.6		(3)
Hycar 2121x26-3	−40.2(82)	56.2	212.2	c	(3)
Hycar 2121x26-4	−21.2(85)	52.1	118.0	c	(3)
Hycar 2121x27-1	21.6(74)	27.1	26.9		(3)
Hycar 2121x27-2	−16.4(73)	21.8	61.5	b	(3)
Hycar 2121x27-3	− 1.5(66)	11.2	31.4	a	(3)
Hycar 2121x27-4	− 1.3(76)	8.2	20.3		(3)
BUTYL RUBBERS					
Hycar 2202	−20.5(73)	15.7	54.2	a	(4)
PR 907-70	− 1.4(71)	0.6	2.3		(4)
HTB 8801	− 3.0(66)	—	24.9	d	(4)
CHLOROPRENES (Neoprenes)					
M-3854	21.0(56)	21.4	34.0	a	(3)
M-3871	−12.0(75)	22.3	40.4	a	(3)
PR 227-70	5.6(72)	3.3	6.3		(3)
A9A-35	− 1.3(78)	4.9	11.0		(3)
A411A-1313	−16.7(64)	20.0	44.5	a	(3)
A411A-1444	−10.8(65)	24.1	51.6	a	(3)
A411A-1757	− 8.3(72)	7.9	17.4		(3)
A411A-1758	− 8.7(69)	10.1	20.8		(3)
A411A-1759	− 4.4(68)	4.3	1.2		(3)
A411A-1760	− 8.1(74)	4.8	4.7		(3)
A109D-71	22.0(67)	7.1	8.9		(3)
A109D-72	2.6(77)	2.5	7.2		(3)
A109D-73	6.5(77)	3.1	3.9		(3)
A109D-74	0.0(56)	9.2	15.3		(3)
A109D-75	−13.0(68)	7.6	3.7		(3)
A109D-87	−20.6(53)	20.3	60.2	b	
A109D-88	−11.3(53)	17.0	47.8	a	
A109D-89	−13.2(53)	17.2	48.9	a	
A109D-90	− 2.0(51)	8.5	18.9		
A109D-91	5.8(52)	5.7	12.3		
A109D-92	0.0(49)	8.2	16.6		
CHLOROSULFONATED POLYETHYLENES (Hypalons)					
S-2	1.3(76)	0.7	1.9		(3)
A2411A-391	−36.6(71)	169.8	26.8	c	(3)
A2109D-3	0.0(78)	3.0	2.2		(3)
HW-B7	−52.6(76)	53.9	363.9	c	(3)
HW-B8	−46.7(75)	41.0	176.7	b	(3)
HW-B9	−19.5(82)	27.6	89.1	a	(3)
PR 1401-70	6.7(75)	1.1	1.6		(3)
FLUOROELASTOMERS					
Kel-F Elastomer	−16.0(75)	10.0	11.6		(2)
Kel-F Elastomer 5500-72	−17.1(70)	10.8	11.7		
Kel-F Elastomer 5500-W	−12.9(62)	—	11.1	d	
1F4	—	—	—	e	(2)
Viton A-1	50.9(55)	9.0	4.5		(2)
Viton A-2	11.7(77)	4.9	3.9		(2)
Viton A-3	16.7(66)	0.6	1.4		(2)
Viton A-4	9.1(88)	6.2	6.5		(2)
Viton A-5	18.2(77)	3.1	4.4		(2)
Viton A-6	15.0(80)	8.7	9.9		(2)
Viton A-7	3.4(88)	1.9	2.7		
Viton A-8	0.0(79)	3.0	2.7		
Viton A-9	2.6(78)	1.4	1.9		
Viton A-10	− 1.3(77)	0.7	0.3		
Viton A-11	0.0(79)	0.6	0.7		
PR 1700-X7	12.0(75)	2.1	1.2		(2)
PR 1710-X69	2.7(74)	3.3	4.0		
PR 17107	− 5.6(71)	12.2	15.1		
NATURAL RUBBERS					
HW-B14	−14.8(54)	4.3	9.4		(4)
TK 1/1	−21.7(69)	6.6	19.7	f	(4)
TK 1/4	−31.4(70)	41.7	162.8	c, g	(4)
NITRILES					
Hycar 1000x88-1	10.8(65)	1.4	1.7		(3)
Hycar 1000x88-2	2.7(75)	2.4	3.5		(3)
Hycar 1001	0.0(75)	2.4	2.7		(3)
Hycar AR	8.8(68)	0.6	1.5		(3)
Hycar 1002	4.2(71)	1.6	2.8		(3)
Hycar 1042	1.5(68)	5.0	11.4		(3)
Hycar 1042-P	− 5.7(75)	8.2	17.0		(3)
Hycar 1072	11.5(87)	1.1	5.6		(3)
Hycar 1043	1.5(68)	3.0	4.7		(3)
Hycar 1014	− 1.4(70)	2.4	4.8		(3)
Hycar 1014x11	5.8(69)	0.7	0.1		(3)
Hycar 1041	0.0(72)	1.4	1.9		(3)
PR 122-70	9.3(75)	2.8	3.7		(3)
PR 142-70	8.5(71)	0.3	1.3		(3)
Parker 46-101	−11.1(72)	0.0	20.1		(3)
Parker 1063-16	13.6(66)	0.1	− 3.2		(3)
Linear 7505-70	15.8(76)	− 1.3	− 2.2		(3)
Linear 7513-80	3.7(82)	3.5	6.5		(3)
POLYSULFIDE (Thiokol)					
PR 1000-70	—	—	—	e	(4)
METHYL VINYL SILICONE RUBBERS					
K-1044R	−17.9(46)	2.4	4.6		(2)
K-1046R	10.0(65)	− 4.5	− 11.1		(2)
K-1047R B-1	18.6(70)	1.9	− 1.2		(2)
K-1047R B-2	5.3(66)	− 0.3	− 0.4		(2)
K-1047R B-3	2.6(76)	0.8	0.9		(2)
K-1047R B-4	29.6(54)	0.5	0.0		(2)
K-1047R B-5	9.4(64)	1.5	1.6		(2)
K-1047R B-6	9.0(67)	1.5	2.3		(2)
K-1048R	2.5(79)	3.3	4.4		(2)
K-1025R	6.4(47)	− 3.0	15.0		(2)
K-1035	− 5.4(56)	4.0	2.2		(2)
XK-1516	18.0(61)	− 3.7	− 7.6		(2)
K-1014	− 4.1(48)	1.4	− 1.6		(2)
SE-361	− 4.0(75)	− 1.6	− 2.6		(2)
SE-371	− 1.3(78)	− 0.7	− 2.6		(2)
SE-381	− 1.2(86)	− 1.4	− 3.5		(2)
HW-B6	−30.9(68)	7.7	7.8		(2)
SE-751	1.7(60)	0.8	− 1.0		(2)
81686	7.6(66)	0.5	0.6		(2)
SE-452	7.4(54)	0.0	0.6		
SE-472	1.3(75)	− 0.2	2.0		
SE-482	2.5(81)	− 0.2	− 0.5		
SE-975	2.7(73)	0.6	0.4		
Silastic S2096	0.0(68)	− 0.4	0.0		
Silastic S2097	1.3(75)	− 0.6	− 0.3		
Silastic S2098	1.1(84)	− 0.4	0.2		
Silastic S2081	3.6(55)	− 0.2	− 0.5		

*Original hardness given in parentheses.

Remarks: (a) Noticeable swelling; (b) Considerable swelling; (c) Large amount of swelling; (d) Thickness measurements not taken; (e) Material disintegrated, properties could not be taken; (f) Light tan color; (g) Yellow-cream color; (h) Material split, could not take hardness; (i) Broke when bent 180 degrees; (j) Crumbled and broke when bent 180 degrees, properties could not be taken—water colored red from filler; (k) Given in Reference 2 as 81716; (l) Protective layers delaminated, properties could not be taken; (m) Material disintegrated, almost dissolving, in water; properties could not be taken; (n) Somewhat stiffer and brownish in color.

TABLE III—CHANGE IN PROPERTIES OF ELASTOMERS AFTER IMMERSION IN BOILING WATER FOR 1000 HOURS (CONT'D.)

Materials	Per Cent Change in Properties: Hardness*	Thickness	Weight	Remarks	Literature References
METHYL VINYL SILICONE RUBBERS (Cont'd.)					
Silastic S2071 B-1	0.0(54)	– 0.3	– 0.3		(4)
Silastic S2071 B-2	0.0(55)	0.0	1.0		
Silastic 50	– 2.9(68)	3.2	2.4		(2)
Silastic 80	0.0(84)	– 0.8	– 0.4		(2)
Cohrlastic 500	—(80)	2.6	3.8	h, i	(2)
Arcosil 2184	– 5.6(54)	3.6	58.4		(2)
DIMETHYL SILICONE RUBBERS					
SE-972	0.0(83)	– 0.7	– 0.3		(2)
81625	11.7(60)	– 0.8	– 1.2		(2)
SE-100	–46.5(43)	– 1.3	– 0.8		
81813	—	—	—	i, j	
Silastic 152	16.0(50)	2.5	1.4		(2)
Silastic 181	–36.9(84)	13.8	14.4		(2)
Silastic 7-170	– 7.9(76)	6.4	10.5		(2)
Cohrlastic 700	–21.5(65)	1.0	– 0.7		(2)
Parker 77-018	– 1.3(78)	4.1	3.7		(2)
SE-701	–15.5(59)	2.6	2.8		
METHYL PHENYL SILICONE RUBBERS					
Y-1632	1.8(55)	0.8	2.3		(4)
SE-550	–19.0(63)	11.3	21.4		(2)
SE-551	– 7.1(56)	2.6	3.3		(2)
81590	– 1.7(58)	4.2	10.1		(2)
81504	23.4(77)	– 0.4	– 2.4		(2)
Silastic 250	–10.9(55)	17.0	34.9		(2)
METHYL PHENYL VINYL SILICONE RUBBERS					
Silastic 675	5.3(75)	1.0	– 0.5		(2)
Silastic S2048	3.1(64)	– 0.9	1.7		(2)
Silastic S6508	28.6(28)	1.7	2.4		(4)
Silastic 916	1.6(62)	0.2	2.2		(2)
XK-1205	19.2(52)	0.0	0.9		(2)
XK-1235R	20.0(50)	—	1.2	d	(4)
SE-555	11.7(60)	1.0	1.6	k	(2)
FLUOROCARBON SILICONE RUBBERS					
Silastic LS-53	13.6(59)	0.4	– 0.1		(2)
SILICONE RUBBERS (TYPE NOT KNOWN)					
S-931	7.3(55)	5.9	5.4		(2)
Fairprene SR-5570	4.8(62)	4.5	2.2		(2)
RADIATION CURED SILICONE RUBBERS					
HW-BA1	15.3(59)	– 0.7	– 1.2		
HW-BA2	9.2(65)	– 0.8	– 2.6		
SILICONE MODIFIED RUBBERS					
SMR M-1	–11.4(69)	40.9	86.6	b, g	(4)
SMR M-1 PS	2.9(71)	21.7	48.5	a	(4)
SMR M-1 PBS	—	—	—	l	(4)
SMR LW70A	0.0(69)	5.6	9.8		(4)
STYRENE RUBBERS					
PR 408-70	1.4(74)	5.7	15.9		(3)
PR 430-X24	– 1.3(77)	10.3	16.6		(3)
PR 430-X27	6.9(72)	0.7	1.3		(3)
Hycar 2001	10.1(69)	6.6	13.3		(3)
HW-B10	0.0(66)	14.0	26.6		(3)
URETHANES					
Adiprene C-1	–64.5(62)	36.5	98.5	b	(2)
Adiprene C-2	–46.7(75)	36.5	69.2	b	(2)
Adiprene C-3	–76.8(69)	46.5	126.9	c	(2)
Adiprene C-4	–73.5(68)	– 2.0	27.0	a	(2)
PR 631-70	–27.3(77)	19.3	35.9	a	(2)
Genthane S	—	—	—	m	(4)
Disogrin DSA 6865	—	—	—	m	(2)
Disogrin DSA 7560	—	—	—	m	(2)
VINYL PYRIDINES					
Philprene VP-A-1	– 5.7(70)	16.7	38.1	a	(4)
Philprene VP-A-2	– 6.2(81)	15.5	32.3	a	(4)
Philprene VP-15-1	–19.1(68)	21.1	64.7	b	(4)
Philprene VP-25-1	–24.3(70)	27.7	85.9	b	(4)
Philprene VP-25-2	–10.3(87)	20.3	41.3	a	(4)
Philprene VP-A-3	3.5	4.6	6.5	n	(4)

*Original hardness given in parentheses.
Remarks: (a) Noticeable swelling; (b) Considerable swelling; (c) Large amount of swelling; (d) Thickness measurements not taken; (e) Material disintegrated, properties could not be taken; (f) Light tan color; (g) Yellow-cream color; (h) Material split, could not take hardness; (i) Broke when bent 180 degrees; (j) Crumbled and broke when bent 180 degrees, properties could not be taken—water colored red from filler; (k) Given in Reference 2 as 81716; (l) Protective layers delaminated, properties could not be taken; (m) Material disintegrated, almost dissolving, in water; properties could not be taken; (n) Somewhat stiffer and brownish in color.

Other Immersion Tests. A few of the most promising materials of several of the elastomer classes which showed up well in the boiling water tests were subjected to another boiling water test for 2000 hours. Die C dumbbell test specimens as described above were used. These tests were run in the same manner as were the high temperature water tests with the exception that they were carried out in reflux condensers. Results are given in Table V which is constructed after the same fashion as Table IV.

Radiation Treatments and Cures. An attempt was made to improve the high temperature water resistance of some of the silicone elastomers by both radiation "treatment" and radiation curing. The treatment consisted of irradiating (as shown in Table II) standard 6 x 6 x .075-inch tensile slabs which had been conventionally cured by peroxide. They were irradiated by gamma rays as described previously *(4)*. After this irradiation treatment dumbbell specimens were cut out and the materials were treated as the others. Results of the immersions are given in Table IV.

For the materials which were cured or vulcanized by gamma radiation, uncatalyzed compound was pressed between one-sixteenth inch thick aluminum sheets and irradiated in accordance with the descriptions given in Table II and Figures 2 and 3. Results of the immersions of these materials are shown in Tables III and IV.

Water Used for Immersions. All materials were immersed in ordinary tap or drinking water. To correlate the damage occuring from immersions in the tap water, several materials were immersed in typical reactor cooling water. Analyses of both types of water are given in Table VI.

Discussion

The data presented in Tables III, IV, and V show how a great many classes of elastomers and many materials within a class are affected by immersion in boiling water in unsealed systems and to high temperature water in sealed systems. All materials are more or less damaged depending upon the type of base polymer and the manner in which they were compounded.

Boiling Water. The results of the 1000 hour boiling water tests using discs show that some classes of elastomers are not suited for service in applications where this environment exists, while other classes must have materials especially compounded for water resistance. For example, the urethane elastomers are all poor in their resistance to immersion in boiling water, while the Hypalon polymer can be compounded to produce a relatively stable material as well as others which are very susceptible to damage.

Acrylics. All of the materials in this class showed poor resistance to the boiling water test. Generally speaking, they all swelled, increased in both thickness and weight, and decreased in hardness. One notable exception to this hardness trend was noted in Hycar 2121x27-1 which increased considerably in hardness. The best materials in the acrylic class were Acrylon BA-12 and Hycar 2121x27-4.

Butyl Rubbers. Only three materials were evaluated in the butyl rubber class. The PR 907-70 material showed up best and was essentially unchanged. Extensive work was not carried out with the butyl rubbers as they are severely damaged in a radiation environment, which precluded an extensive evaluation.

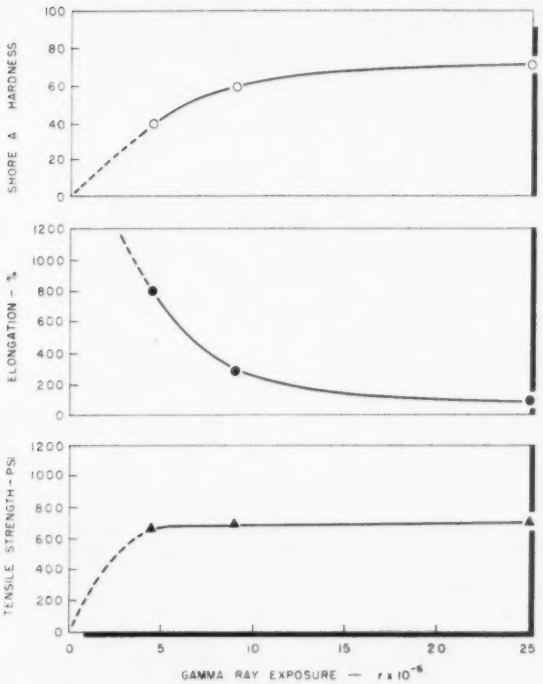

FIG. 2—Properties of K-1047R methyl vinyl silicone elastomer cured by gamma radiation.

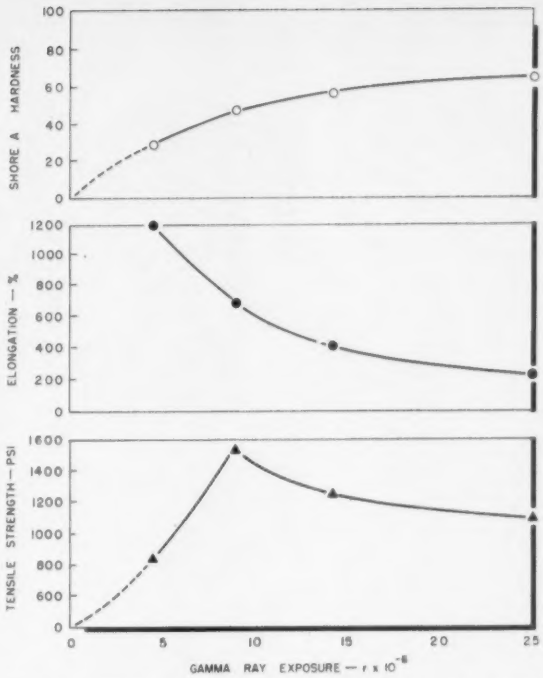

FIG. 3—Properties of SE-555U methyl phenyl vinyl silicone elastomer cured by gamma radiation.

Chloroprenes. Twenty-one neoprene compounds were evaluated and the resistance of these materials ranged from very good with little change, to poor with relatively large increases in weight and thickness. Depending upon the type of compound, the hardness was either increased or decreased. However, two materials, A109D-74 and A109D-92, exhibited no hardness change although both weight and thickness were increased. Several of the materials examined appear suitable for use in boiling water.

Chlorosulfonated Polyethylenes. The Hypalon materials, like the neoprenes, showed a wide range in resistance to boiling water. All materials increased in both weight and thickness with the hardness not following any definite trend. Compound A2109D-3 appeared to be the best material evaluated in this class.

Fluoroelastomers. This class of elastomers comprised many materials with different base polymers. Materials compounded with Viton A appeared superior although these materials showed a wide range in their resistance. With the exception of four materials all compounds gained in hardness. Weight and thickness were also increased to varying degrees.

Natural Rubbers. Only three materials in this class were investigated. All decreased in hardness and gained in weight and thickness to varying degrees.

Nitriles. Many materials in this class which appear suitable for use in boiling water were examined. Three compounds decreased in hardness and two others lost weight, while one lost in thickness. All other materials, with the exception of two which showed no hardness

TABLE IV—EFFECT OF HIGH TEMPERATURE WATER IMMERSION ON THE PHYSICAL PROPERTIES OF ELASTOMERS

Material and Immersion Time (Hours)	Initial Properties and Per Cent Change for Each Immersion Temperature — Hardness Shore A; Δ %			Elongation %; Δ %			Tensile psi; Δ %			Remarks and Literature References
	125°C.	150°C.	175°C.	125°C.	150°C.	175°C.	125°C.	150°C.	175°C.	
CHLOROPRENES (Neoprenes)										
A109D-73		77			255			3185		(3)
40	2.6	—	—	— 28.8	—	—	— 7.9	—	—	
150	1.3	1.3	1.3	— 43.4	— 55.1	— 62.9	— 17.0	— 32.2	— 38.7	a
500	— 1.3	—	—	— 53.1	—	—	— 28.5	—	—	b
1000	— 1.3	—	—	— 53.1	—	—	— 36.9	—	—	c
A109D-74		56			730			2195		(3)
150	— 8.9	— 14.3	— 19.6	— 45.4	— 76.8	— 89.8	— 60.6	— 89.9	— 94.6	d, e
CHLOROSULFONATED POLYETHYLENE										
Hypalon A2109D-3										(3)
150	— 6.4	— 15.4	—	— 32.0	— 76.2	—	— 27.3	— 79.1	—	f, g
FLUOROELASTOMERS										
Viton A-7		88			250			2270		(4)
150	—	—	3.4	—	—	60.0	—	—	— 43.0	
Viton A-8		79			180			2285		(4)
150	—	—	— 1.3	—	—	0.0	—	—	— 52.7	j
Viton A-9		78			165			1810		(4)
150	—	—	20.5	—	—	— 47.9	—	—	— 51.1	h
Viton A-10		77			140			1745		(4)
150	—	—	— 2.6	—	—	— 10.7	—	—	— 41.9	
Viton A-11		79			125			2095		(4)
150	—	—	5.1	—	—	26.0	—	—	— 50.4	
Viton A-12		58			365			1245		
150	—	—	37.9	—	—	57.5	—	—	— 26.7	
Viton A-13		67			340			2100		
150	—	—	25.4	—	—	17.6	—	—	— 57.0	
Viton A-14		75			260			1975		
150	—	—	17.3	—	—	30.8	—	—	— 53.7	
Viton A-15		84			200			1720		
150	—	—	7.1	—	—	47.5	—	—	— 58.0	
Viton A-16		67			800			1285		
150	—	—	14.9	—	—	— 61.3	—	—	— 75.9	h
Viton A-17		68			420			1960		
150	—	—	13.2	—	—	— 38.1	—	—	— 59.2	i
Viton A-18		69			325			2205		
150	—	—	13.0	—	—	— 38.5	—	—	— 46.2	h
Kel-F Elastomer 5500-W		62			550			1810		(4)
150	—	—	— 22.6	—	—	38.2	—	—	— 75.8	j
PR 17107		73			185			1645		
150	—	—	4.1	—	—	2.7	—	—	— 24.7	
500	—	— 9.6	— 17.8	—	81.1	86.5	—	— 30.4	— 53.8	k, l
1200	— 12.3	— 12.3	— 20.5	75.5	75.5	48.6	— 25.8	— 41.1	— 62.7	m, f, n
NITRILES										
Hycar 1001		72			520			3675		(3)
150	0.0	0.0	— 2.8	— 33.4	— 30.4	— 39.2	— 4.7	— 12.9	— 29.9	h
Hycar 1002		71			440			3185		(3)
40	0.0	— 1.4	— 4.3	— 22.7	— 23.4	— 24.5	— 5.4	— 3.1	— 7.3	
150	0.0	— 2.8	4.2	— 28.4	— 19.3	— 27.3	— 7.8	— 8.4	— 9.3	j
500	— 2.8	5.6	7.2	— 20.5	— 31.0	— 49.4	— 4.6	— 11.4	— 22.1	j, o
1000	0.0	0.0	4.2	— 22.7	— 36.4	— 74.5	— 7.0	— 18.3	— 48.9	o, p
Hycar 1072		86			330			3900		(3)
500	— 20.9	— 38.8	— 59.3	— 31.8	— 72.7	— 84.4	— 47.6	— 88.2	— 95.1	q, r, s
METHYL VINYL SILICONE RUBBERS										
K-1044R		46			360			1080		(2)
150	—	— 26.8	— 45.5	—	— 27.6	— 23.4	—	— 53.9	— 71.4	
K-1046R		65			290			855		(2)
150	—	— 12.3	— 32.3	—	— 30.6	— 41.9	—	— 44.6	— 76.9	
K-1047R B-1		76			310			1010		(2)
150	2.6	5.3	— 40.8	— 21.0	— 41.9	— 71.0	— 13.7	— 37.5	— 90.8	

Remarks: (a) Slight swelling at 175°C.; (b) Swelled; gained about ⅛-inch in length at 125°C.; (c) Swelled; gained about ¼-inch in length at 125°C.; (d) Swelled; gained about ¼-inch in length at 150°C.; (e) Swelled; gained about ½-inch in length at 175°C.; blistered on surface; (f) Swelled; gained about ⅜-inch in length at 150°C.; (g) Crumbled; bad blistering; could not test at 175°C.; (h) Swelled; gained about 3/16-inch in length at 175°C.; (i) Swelled; gained about 5/16-inch in length at 175°C.; (j) Swelled; gained about ⅛-inch in length at 175°C.; (k) Swelled; gained about 5/16-inch in length at 150°C.; (l) Swelled; gained about ⅜-inch in length at 175°C.; (m) Swelled; gained about 5/16-inch in length at 125°C.; (n) Swelled; gained about 7/16-inch in length at 175°C.; (o) Swelled; gained about 3/32-inch in length at 150°C.; (p) Swelled; gained about ½-inch in length at 175°C.; (q) Swelled; gained about ½-inch in length at 125°C.; (r) Swelled; gained about 1-inch in length at 150°C.; (s) Swelled; gained about 2-inches in length at 175°C.; (t) Swelled; gained about 1/16-inch in length at 175°C.; (u) Slightly cheesy at 175°C.; (v) Broke when bent 180 degrees; (w) Swelled; gained about 3/16-inch at 125°C.

TABLE IV—EFFECT OF HIGH TEMPERATURE WATER IMMERSION ON THE PHYSICAL PROPERTIES OF ELASTOMERS (CONT'D.)

Material and Immersion Time (Hours)	Initial Properties and Per Cent Change for Each Immersion Temperature: Hardness Shore A; Δ % 125°C.	150°C.	175°C.	Elongation %; Δ % 125°C.	150°C.	175°C.	Tensile psi; Δ % 125°C.	150°C.	175°C.	Remarks and Literature References
METHYL VINYL SILICONE RUBBERS (Cont'd.)										
K-1047R B-2	66			285			820			(2)
150	0.0	— 7.6	— 25.8	— 20.5	— 27.6	— 47.0	— 20.1	— 38.3	— 78.7	
50	——	— 11.1	——	——	— 23.4	——	——	— 53.5	——	
1000	— 13.6	— 16.4	——	— 15.2	— 48.9	——	— 48.8	— 74.3	——	
K-1047R B-3	76			230			885			
150	— 2.6	— 4.0	— 15.8	— 17.4	— 43.5	— 52.2	— 9.1	— 46.8	— 72.4	
1000	— 5.3	——	——	— 15.2	——	——	— 48.8	——	——	j
K-1047R B-4	54			620			1020			(2)
150	17.0	0.0	— 38.9	— 21.2	— 22.0	— 52.6	— 13.9	— 31.8	— 88.5	t
K-1047R B-5	64			400			965			(2)
150	1.6	— 9.4	— 35.9	— 25.2	— 27.7	— 62.6	— 17.2	— 41.5	— 83.1	
K-1047R B-6	67			375			940			(2)
150	— 5.9	— 10.5	— 16.4	— 26.3	— 30.3	— 63.8	— 21.0	— 40.8	— 86.9	
K-1048R	79			215			875			(2)
150	——	— 3.2	— 10.1	——	— 58.1	— 88.4	——	— 54.7	— 83.4	
SE-361	63			140			885			(2)
40	— 4.5	— 7.5	— 19.1	— 9.1	22.7	30.4	— 20.5	— 35.2	— 47.5	
150	— 6.4	— 8.0	— 23.0	8.7	— 2.2	26.8	— 20.9	— 35.6	— 67.0	
500	— 6.4	— 13.9	— 44.6	— 2.9	13.0	— 15.0	— 38.4	— 58.5	— 92.1	
1000	— 11.1	— 23.8	— 76.9	— 5.8	8.7	—100.	— 40.3	— 61.2	—100.	u, v
SE-371	75			90			905			(2)
150	— 6.7	— 8.0	— 23.0	— 11.1	— 16.7	— 5.6	— 18.7	— 28.8	— 63.8	
500	— 8.0	— 12.0	— 37.3	— 11.1	— 16.7	— 88.9	— 29.7	— 48.3	— 91.4	v
1000	— 6.7	— 13.3	——	— 16.7	— 33.3	——	— 33.6	— 60.1	——	
SE-381	83			65			925			(2)
150	— 3.6	— 6.0	— 13.3	— 39.4	— 24.2	— 24.2	— 31.2	— 42.0	— 58.0	
500	— 3.6	——	— 20.5	— 31.8	——	— 84.8	— 39.6	——	— 88.1	v
1000	——	— 4.8	——	——	— 47.0	——	——	— 57.4	——	
SE-452	54			370			935			
150	——	——	— 29.6	——	——	5.4	——	——	— 86.3	
500	——	— 13.0	——	——	13.5	——	——	— 55.1	——	
SE-472	75			200			875			
500	——	— 10.7	——	——	0.0	——	——	— 73.7	——	
SE-482	81			220			1025			
380	——	——	— 1.2	——	——	— 86.4	——	——	— 71.1	
500	——	1.2	——	——	— 45.5	——	——	— 50.8	——	
Silastic S2096	70			120			655			
150	——	——	— 5.7	——	——	— 16.7	——	——	— 30.4	
500	——	— 2.9	——	——	— 20.0	——	——	— 16.7	——	
1000	——	— 5.7	— 7.4	——	— 4.2	— 46.7	——	— 27.7	— 59.4	
Silastic S2097	80			105			820			
150	——	——	— 3.8	——	——	— 19.0	——	——	— 26.4	
500	——	— 2.5	——	——	— 33.3	——	——	— 34.1	——	
1000	——	——	— 6.7	——	——	— 41.7	——	——	— 62.4	
Silastic S2098	87			90			825			
150	——	——	— 2.3	——	——	— 27.8	——	——	— 26.9	
500	——	— 1.1	——	——	— 22.2	——	——	— 5.1	——	
1000	——	0.0	— 1.2	——	— 11.1	— 66.7	——	— 13.3	— 58.1	v
Silastic S2081	55			375			800			
150	——	——	— 16.4	——	——	— 4.0	——	——	— 62.3	
500	——	1.8	— 52.7	——	0.0	— 89.3	——	— 47.0	— 95.4	o, h, u
Silastic S2071 B-1	50			320			900			(4)
40	4.9	— 4.0	— 8.0	6.4	42.9	21.1	— 12.0	— 19.5	— 32.2	
150	4.0	— 8.2	— 20.0	16.5	4.0	2.5	— 17.1	— 44.4	— 67.8	
500	4.9	— 13.1	— 69.1	— 26.1	— 38.7	—100.	— 28.1	— 48.3	—100.	u, v
1000	2.0	— 16.0	— 72.7	— 8.4	3.2	—100.	— 41.6	— 70.6	—100.	u, v
Silastic S2071 B-2	55			265			880			
150	——	——	— 41.8	——	——	— 65.9	——	——	— 24.5	
500	——	——	— 50.9	——	——	— 77.4	——	——	— 94.9	t
Silastic 50	65			290			950			(2)
150	— 6.2	— 13.9	— 35.4	— 6.3	— 27.1	— 27.1	— 16.2	— 51.3	— 78.9	
500	——	— 27.7	——	——	— 22.4	——	——	— 65.7	——	
Silastic 80	81			235			845			(2)
150	— 2.3	— 3.7	— 8.1	— 7.7	— 44.9	— 82.1	— 19.7	— 55.2	— 69.5	
500	— 3.8	— 4.9	— 25.9	— 6.7	— 40.4	—100.	— 16.9	— 54.2	—100.	v
1000	— 3.8	— 3.7	——	14.9	— 70.3	——	— 37.6	— 67.3	——	
K-1014	48			590			430			(2)
150	— 27.1	— 38.6	— 58.3	— 14.4	— 1.7	— 5.1	— 32.8	— 47.9	— 74.4	
DIMETHYL SILICONE RUBBER										
SE-972	79			80			790			(2)
150	——	— 8.9	— 43.0	——	0.0	12.5	——	— 38.4	— 80.4	

TABLE IV—EFFECT OF HIGH TEMPERATURE WATER IMMERSION ON THE PHYSICAL PROPERTIES OF ELASTOMERS (CONT'D.)

Material and Immersion Time (Hours)	Initial Properties and Per Cent Change for Each Immersion Temperature — Hardness Shore A; Δ %			Elongation %; Δ %			Tensile psi; Δ %			Remarks and Literature References
	125°C.	150°C.	175°C.	125°C.	150°C.	175°C.	125°C.	150°C.	175°C.	
METHYL PHENYL SILICONE RUBBERS										
SE-551		59			270			985		(2)
150	—	— 33.9	—	—	9.3	—	—	— 78.0	—	g
Y-1632		55			195			415		(4)
150	—	—	— 50.9	—	—	—100.	—	—	—100.	h
METHYL PHENYL VINYL SILICONE RUBBERS										
Silastic 675		77			195			730		(2)
150	— 1.3	— 1.3	— 2.6	4.6	0.0	— 49.0	— 6.4	— 13.3	— 59.6	
500	—	— 1.3	— 11.7	—	— 3.1	—100.	—	— 33.4	— 89.2	v
1000	— 1.3	—	— 13.0	— 8.2	—	—100.	— 26.0	—	—100.	u, v
Silastic S2048		57			360			555		(2)
150	— 14.0	— 33.3	—	— 18.1	— 30.6	—	— 38.8	— 60.7	—	g
Silastic S6508		28			600			770		(4)
150	—	3.6	— 32.1	—	— 20.0	— 50.8	—	— 32.8	— 87.2	
XK-1235R		50			600			1550		(4)
150	—	—	— 14.0	—	—	— 20.0	—	—	— 79.0	
SE-555		60			590			1590		(2)
150	—	— 1.7	— 11.7	—	— 31.4	— 89.0	—	— 53.1	— 93.4	
Silastic 916		62			580			1505		(2)
150	—	— 8.1	— 9.7	—	— 33.4	— 77.5	—	— 47.1	— 79.3	
IRRADIATED SILICONE RUBBERS										
SE-371 W-1-R		84			50			1055		
150	— 10.7	— 14.3	— 28.6	20.0	20.0	10.0	— 25.3	— 45.0	— 58.0	
Silastic S2048 W-1-R		65			175			735		
150	— 16.9	— 39.1	—	34.3	8.6	—	— 53.3	— 71.2	—	g
FLUOROCARBON SILICONE RUBBERS										
Silastic LS-53		59			220			1260		(2)
150	5.1	— 6.8	— 37.3	2.7	0.0	— 17.8	— 24.0	— 52.2	— 93.4	
RADIATION CURED SILICONE RUBBERS										
HW-BA1		59			325			710		
150	—	— 1.7	— 18.6	—	— 18.5	— 29.2	—	— 17.3	— 50.1	
HW-BA2		65			215			635		
150	—	—	— 13.9	—	—	— 18.6	—	—	— 37.8	
1000	—	— 7.7	— 50.8	—	— 11.6	— 83.7	—	— 25.0	— 93.6	
HW-BA3		73			120			800		
150	—	—	— 8.2	—	—	— 16.7	—	—	— 33.6	
HW-BA6		71			110			750		
150	—	—	4.2	—	—	— 36.4	—	—	— 34.1	
HW-BA7		64			225			1100		
150	—	—	— 12.1	—	—	— 37.8	—	—	— 75.1	
HW-BA4		80			60			880		
150	—	—	— 6.3	—	—	— 33.0	—	—	— 38.6	
HW-BA8		76			75			960		
150	—	—	— 15.8	—	—	7.1	—	—	— 49.8	
STYRENE RUBBER										
PR 408-70		71			365			2065		(3)
150	— 8.5	— 14.1	— 25.4	— 20.8	— 45.4	— 59.0	— 4.5	— 42.8	— 66.2	d, n, w

Remarks: (a) Slight swelling at 175°C.; (b) Swelled; gained about ⅛-inch in length at 125°C.; (c) Swelled; gained about ¼-inch in length at 125°C.; (d) Swelled; gained about ¼-inch in length at 150°C.; (e) Swelled; gained about ½-inch in length at 175°C.; blistered on surface; (f) Swelled; gained about ⅜-inch in length at 150°C.; (g) Crumbled; bad blistering; could not test at 175°C.; (h) Swelled; gained about 3/16-inch in length at 175°C.; (i) Swelled; gained about 5/16-inch in length at 175°C.; (j) Swelled; gained about ⅛-inch in length at 175°C.; (k) Swelled; gained about 5/16-inch in length at 150°C.; (l) Swelled; gained about ⅜-inch in length at 175°C.; (m) Swelled; gained about 5/16-inch in length at 125°C.; (n) Swelled; gained about 7/16-inch in length at 175°C.; (o) Swelled; gained about 3/32-inch in length at 150°C.; (p) Swelled; gained about ½-inch in length at 175°C.; (q) Swelled; gained about ½-inch in length at 125°C.; (r) Swelled; gained about 1-inch in length at 150°C.; (s) Swelled; gained about 2-inches in length at 175°C.; (t) Swelled; gained about 1/16-inch in length at 175°C.; (u) Slightly cheesy at 175°C.; (v) Broke when bent 180 degrees; (w) Swelled; gained about 3/16-inch at 125°C.

change, were increased to varying degrees in hardness, thickness and weight.

Polysulfide. Only one material based upon a Thiokol polymer was evaluated. This compound was severely damaged and was completely disintegrated.

Silicone Rubbers. The major portion of the boiling water immersion studies were carried out with the various types of silicone elastomers. The results of the boiling water immersions show that there is essentially very little difference between the silicone classes (dimethyl, methyl vinyl, phenyl, and methyl phenyl vinyl) as they all have specific compounds which appear suitable for use in boiling water.

There are, however, a few materials within each

class which are changed to such an extent that they should not be used in a boiling water environment. One of these, the room temperature vulcanizing material 81813, would undoubtedly have shown up much better had it been given a post cure after the room temperature cure. However, it was tested without the post cure to determine its merits for an application where no practical post cure could be given before the material would be exposed to boiling water. Generally speaking, the properties measured do not follow any definite pattern.

Radiation Cured Silicone Rubbers. The two materials studied in this class were changed considerably more than their peroxide cured counterpart, Silastic S2071. Most noticeable was the increase in hardness.

Styrene Rubbers. In general, these materials appear to be suitable for use in boiling water although they do exhibit more change in weight and hardness than the best materials discussed above.

Urethanes. These materials were badly damaged from the immersions, the damage ranging from considerable swelling to complete disintegration. All materials which did not disintegrate softened considerably and gained in both thickness and weight.

Vinylpyridines. With the exception of Philprene VP-A-3, all of these materials appear to be unsuitable for use in boiling water. They softened and increased both in thickness and weight.

The elastomers (dumbbell tensile specimens) which were immersed in boiling water for 2000 hours were representative of some of the better materials which were screened in disc form for 1000 hours in boiling water. All of these materials — one neoprene, two nitrile, and twelve silicone rubbers—appear in varying degrees to be suitable for use in boiling water. With the exception of Hycar 1072, which increased in tensile strength, all materials showed a decrease in tensile. The elongation and hardness showed no definite trend, being either increased or decreased or held to no change.

TABLE V—CHANGES IN PROPERTIES OF ELASTOMERS AFTER IMMERSION IN BOILING WATER FOR 2000 HOURS

Materials	Initial Properties and Per Cent Change: Hardness Shore A; Δ %	Elongation %; Δ %	Tensile psi; Δ %	Weight	Remarks and Literature References
CHLOROPRENE					
Neoprene A109D-73	78	230	2900	—	(3)
	— 1.3	—40.9	—18.8	—	*
NITRILES					
Hycar 1002	71	440	3195	—	(3)
	1.4	—40.9	—10.0	—	*
Hycar 1072	86	330	3900	—	(3)
	16.3	—39.4	9.4	10.5	a
SILICONE RUBBERS					
SE-361	65	115	945	—	(2)
	— 1.5	—21.7	—41.4	—	*
SE-371	75	90	905	—	(2)
	— 4.0	—11.1	—45.6	—	*
SE-381	83	65	925	—	(2)
	0.0	—39.4	—53.1	0.8	
SE-452	54	370	935	—	
	9.3	—18.9	—22.9	-1.3	
SE-472	75	200	875	—	
	5.3	- -75.0	—66.4	-3.4	
SE-482	81	220	1025	—	
	6.2	—75.0	—53.8	-2.6	
Silastic 50	55	360	1005	—	(2)
	5.5	—27.8	—46.3	3.5	
Silastic 80	81	235	845	—	(2)
	2.5	—59.6	—52.8	—	*
Silastic S2071 B-1	61	240	865	—	(4)
	3.3	10.4	—29.9	—	*
Silastic S2096	70	120	655	—	
	1.4	0.0	— 4.3	0.0	
Silastic 675	77	195	730	—	(2)
	2.6	0.0	— 5.6	0.5	
K-1047R B-2	67	235	935	—	(2)
	7.5	—36.7	—13.0	1.3	

*Weight not taken; a = very stiff; gained ⅛-inch in length.

Boiling Water Summary

From the data presented in Table III and V it can be seen that there are many classes of elastomers as well as several materials within some of the classes that appear to be suitable for use in applications which require immersion in boiling water. Within those classes which seemed most promising, there was often a wide range of resistance, indicating that the manner in which the polymer is compounded is equally as important as the selection of the base polymer. For those classes which showed up poorly, it appears that compounding cannot overcome the basic deficiencies of the polymer.

With respect to changes in the various properties which were taken, there was no definite trend noted. The silicone rubbers which were radiation cured did not show up better in the boiling water (system not sealed) than the same material cured conventionally with peroxide catalyst. It should be remembered that the data presented here cover only a small portion of the materials which could be compounded from the various classes listed. An examination of some of these additional materials might indicate that some of the classes should be upgraded from the position in which they have been placed here.

High Temperature Water

Table IV, which presents data on the high temperature water immersions up to 175°C., at various times from 40 hours to 1000 hours, shows that that environmental conditions can be extremely severe to the materials, even to those which showed up well under the boiling water immersions. There is apparently very little or no correlation between boiling water damage and that induced by high temperature water. This is most likely due to the sealed systems, with the normal steam table pressure increases which are encountered with the high temperature water immersions while the boiling water tests were in open systems at atmospheric pressure. It should be noted that many of the materials and classes which showed up poorly in the boiling water tests were not included here. The few which were studied but not included in Table IV will be discussed under the appropriate classes below.

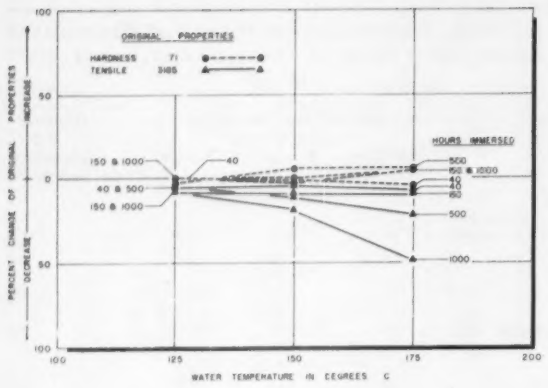

FIG. 4—Change in properties of Hycar 1002 nitrile elastomer induced by immersion in high temperature water for various periods of time.

Properties. In the following discussion no specific mention of the elongation of the various materials is made. This is because it was felt that the elongation does not show the useful condition of the material. For example, many of the materials lost the major percentage of their tensile strength and became quite soft while their elongation remained essentially unchanged. Therefore, hardness and tensile strength, which along with brittleness and swelling always showed a definite trend, were used as the criteria of the condition of the materials. It should be noted here that in some instances anomalies exist in Table IV with respect to property changes for a given material. It appears that these anomalies are caused by the use of different batches of the same material which possessed slightly different original properties.

Water Used. The major portion of the work reported here for both the boiling water and high temperature water studies utilized Hanford Laboratory tap or drinking water. Some parallel tests were run in typical cooling water from a Hanford reactor. The results of the immersions were in all cases the same. Analyses of both types of water are shown in Table VI. It is felt that the results would be essentially the same using distilled or deionized water.

Acrylics. None of these materials were included in the high temperature water tests because, as a class, they showed up poorly in the boiling water immersions.

Butyl Rubbers. One material, PR 907-70, which showed up rather well in boiling water was immersed for 150 hours at 175°C. (data not given in Table IV). The material evidently underwent serious reversion or depolymerization, as it lost 98% of its tensile strength and 42% of its hardness. It was quite tacky and swelled.

Chloroprenes. Two neoprenes cured with a red lead system (A109D-73 and 74) and one cured with a zinc oxide-magnesia system (A109D-72, not shown in Table IV) were evaluated. All of these materials swelled considerably and were decreased in both tensile strength and elongation.

The A109D-73 material showed essentially no change in hardness while the hardness of the other two materials was decreased. A109D-73 is rated the best of the neoprenes evaluated with A109D-72 second and A109D-74 the poorest. The presence of the SRF black and plasticizer in A109D-73 evidently accounts for its superiority over A109D-74, and the red lead cure accounts for its superiority over the A109D-72. This latter material was heavily loaded with carbon black which in all probability renders this material better than the red lead cured A109D-74.

With respect to neoprene A109D-73, damage appears to be immediate and more dependent upon temperature than time. The material at 125°C., was not damaged as badly after 1000 hours as the data at 40 and 150 hours might indicate. For some applications this material appears suitable for use in sealed systems up to a water temperature of 125°C.

Chorosulfonated Polyethylenes. Only one material, Hypalon A2109D-3, was evaluated as it was the best with respect to boiling water resistance. However, at the higher temperatures this material was severely damaged and appears unsuitable for use in a high temperature water environment.

Fluoroelastomers. As past experience and work with the discs in boiling water indicated that in the fluoroelastomer class the Viton A polymer appeared most suitable for hot water immersion studies, the major portion of the work here is concerned with this material. Twelve compounds (Viton A-7 through A-18), whose recipes are given, and one compound (PR 17107), a proprietary material, were studied and are discussed below.

In all instances the tensile strength of the Viton materials was reduced, while the elongation and hardness were either increased or decreased. Based upon the data obtained with PR 17107, it appears that temperature affects this material to a greater extent than does time. That is, after an initial property degradation in a relatively short time, the slope of the change in properties levels out and one could predict that the material would still possess strength and integrity after a much longer exposure than shown in Table IV at the various temperatures. On the other

TABLE VI—TYPICAL ANALYSIS OF WATER USED FOR IMMERSION STUDIES

All values except pH in parts per million

Tap Water		Reactor Cooling Water
8.0	pH	7.00
0.3	Turbidity	0.01
182.0	Methyl Orange	45.00
162.5	Hardness	80.00
266.0	Total Solids	100.00
26.0	SO_4^{-2}	20.00
8.2	Cl	1.50
34.0	SiO_2	5.00
0.034	Fe	0.01
Less than 0.002	Cr^3	Less than 0.005
0.010	Cu	Less than 0.01
Less than 0.050	Al	Less than 0.10
7.2	Mg	4.00
31.1	Ca	20.00

hand, the data indicate that the material would continue to be degraded quite rapidly as the temperature was increased.

A study of the compounding ingredients of the Viton A series shows that, in the twelve materials studied, the HMDA Carbamate cure with the Hi-Sil, Blanc Fixe, or Super Multifex fillers, and the Dyphos and zinc oxide acid acceptors, provide compounds with the best water resistance at 175°C. This is based upon the data obtained from Vitons A-7, A-8 and A-10. It is also of interest to note that as the HMDA Carbamate curing agent is increased the compounds show better resistance to water at 175°C. This is shown from the work with Vitons A-16, A-17 and A-18. The foregoing comparisons of the materials are based upon minimum changes observed in hardness and tensile strength.

With respect to the data obtained from the Viton A series at 175°C. for 150 hours and with the PR 17107 at several temperatures and times, it appears that the Viton A polymer, properly compounded, would be suitable for long time immersion in water at temperatures up to 175°C. in sealed systems.

Nitriles. The nitrile rubbers constitute a class which exhibits a tremendous variation in its resistance to immersion in high temperature water in sealed systems. This is illustrated by comparing Hycar 1002, the best of the nitriles evaluated, with the carboxyl-containing Hycar 1072, one of the poorest examined. Others, not shown in Table IV, range between these two compounds.

As all of these materials were compounded in the same recipe, the only variable being the type nitrile polymer used, it is concluded that, with everything else being equal, the polymer itself determines the resistance of the compound to immersion in high temperature water. This, of course, is not true of immersion in boiling water, as shown by the data in Table III.

Graphic illustrations of how the properties of Hycar 1002 are changed by immersion in high temperature water are shown in Figures 4 and 5, which are plotted from the data given in Table IV. The former shows the effect of temperature for various periods of time, while the latter shows the effect of immersion time for the several different temperatures. Here again, based upon tensile strength change, temperature appears to have a more severe effect on the properties than does time. The nitrile rubber swells slightly more as either the time of immersion is extended or the temperature is raised.

In summary, the nitrile rubbers, as exemplified by Hycar 1002, appear to be quite suitable for use in sealed systems of water up to 175°C. for prolonged periods of time. It is concluded that the superior showing of Hycar 1002 in high temperature water is attributed to the fact that it is quite resistant to hydrolysis and to the fact that it is not exposed to oxidation, which is one of the principal mechanisms which degrades this material in high temperature air. It is therefore of the utmost importance for optimum performance that this material be utilized in high temperature water applications with no contact with air.

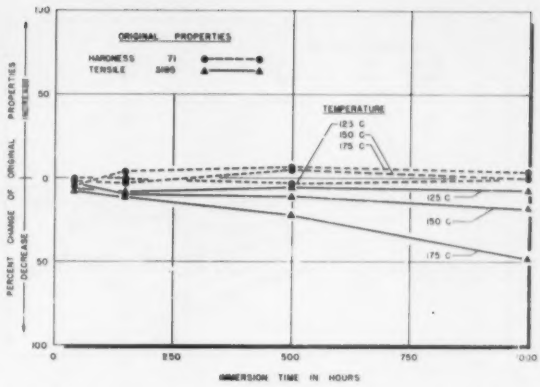

FIG. 5—Change in properties of Hycar 1002 nitrile elastomer induced by immersion in high temperature water for various periods of time.

Silicone Rubbers in High Temperature Water

The silicone elastomers included have been, for purposes of presentation, classified by type as follows: methyl vinyl, dimethyl, methyl phenyl, methyl phenyl vinyl, fluorocarbon, irradiated, and radiation cured.

Methyl Vinyl Silicone Rubbers. It is generally accepted that the methyl vinyl silicone gums are superior to the other types of silicone gums with respect to heat aging resistance in sealed systems both in air and in the presence of water. Choice of filler and curing system also play important roles in determining the water resistance of a silicone rubber *(5)*. The data shown in Table IV substantiate the fact that the methyl vinyl silicone elastomers show up better as a class than do the other types. Some overlapping does occur, as for example, Silastic 675 methyl phenyl vinyl rubber is more water resistant than several of the methyl vinyl elastomers. This is attributed to differences in compounding and curing.

With very few exceptions, all of the fully post cured methyl vinyl compounds showed loss of both hardness and tensile strength while the elongation did not follow a definite pattern. The loss of hardness and tensile strength and complete deterioration shown by some materials is indicative that the silicone gum had become depolymerized or experienced reversion. In the instances where the hardness was either unchanged or had increased slightly it is felt that if the immersions had been carried out at higher temperatures and/or for longer periods of time that the hardness would have exhibited a marked decrease.

How the properties of a typical methyl vinyl silicone elastomer, SE-361, are changed by immersion in high temperature water are shown in Figures 6 and 7, which are plotted from the data given in Table IV. Figure 6 shows the effect of temperature for various periods of time, while Figure 7 shows the effect of immersion time for the several different temperatures. Property damage appears to be induced immediately (within a few hours) at any immersion temperature above 100°C. after which the damage is sustained at a much slower rate. Therefore, temperature has much

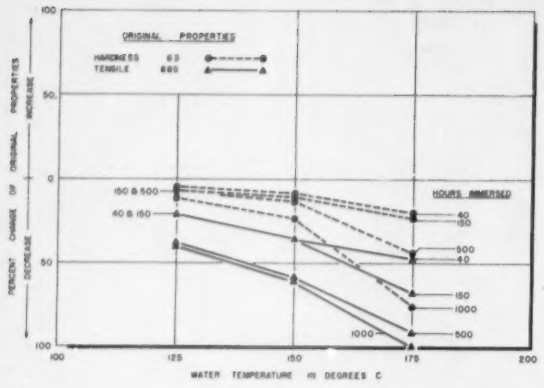

FIG. 6—Change in properties of SE-361 methyl vinyl silicone elastomer induced by immersion in high temperature water for various periods of time.

more of a degrading effect than does time. This is generally typical of the other methyl vinyl silicone elastomers evaluated.

Dimethyl Silicone Rubbers. Only one material in this class is shown in Table IV. After immersion in water at 175°C. for 150 hours this material, SE-972, had lost a substantial amount of both hardness and tensile strength. Other dimethyl silicone rubbers not shown in Table IV also showed up poorly.

Methyl Phenyl Silicone Rubbers. These materials also are adversely affected by immersion in high temperature water and are badly degraded as evidenced by large decreases in tensile strength and hardness.

Methyl Phenyl Vinyl Silicone Rubbers. These materials, like the methyl phenyl types, are all degraded quite severely by sealed systems of hot water. Of the materials of this type evaluated, Silastic 675 appears to offer the best resistance. It is, however, affected very severely as the immersion temperature is raised from 150° to 175°C.

Fluorocarbon Silicone Rubber. Silastic LS-53, the only material of this type evaluated, appears unsuitable for use in high temperature water because a large amount of reversion occurs.

Irradiated Silicone Rubbers. Previous work *(6)* has shown that one of the major factors contributing to the degradation of silicones in sealed systems of hot water is the residual peroxide catalysts which remain in the silicone elastomer after curing. Post curing aids somewhat in the removal of the catalyst residues, but there is still enough present in the elastomers to produce both acidic and basic materials which are responsible for reversion of the silicone polymer.

In an attempt to remove the residual catalyst materials a methyl vinyl silicone rubber (SE-371) and a methyl phenyl vinyl material (Silastic S2048) were irradiated with gamma rays after they had received the conventional peroxide cure and post cure treatment. It is apparent that the radiation treatment affected only the main polymer as the materials showed no evidence of improved resistance to immersion in high temperature water.

Radiation Cured Silicone Rubbers. It has been shown previously *(6)* that a silicone elastomer can be made more resistant to high temperature water induced reversion by eliminating the normal peroxide curing agents and preparing the material by other means, such as ionizing radiation. To determine the merits of this approach, several uncatalyzed methyl vinyl compounds and one uncatalyzed methyl phenyl vinyl compound were cured by means of gamma radiation, as described and shown in Table II and Figures 2 and 3.

The results of the immersions of these materials in high temperature water shows that a marked improvement is effected and all of the materials are superior in their resistance to their conventionally cured counterparts. Work done with the uncatalyzed methyl vinyl compounds SE-361 and Silastic S2071 shows that the resistance to change of these materials in high temperature water is a function of the amount of radiation dose used for curing—the higher the dose, the more resistant are the materials. This pattern would be expected to hold true out to the point where the radiation cure would be so great that radiation induced damage to the elastomers would occur.

Filler Loading. As most of the silicone rubbers evaluated were proprietary items, no conclusions can be drawn as to the effect of the type of filler on the high temperature water resistance of these materials. However, some remarks can be made concerning the amount of filler as shown by examining the methyl vinyl silicone rubbers which more or less comprise a series and are essentially only different in the amount of filler loading. These are the materials forming a series commencing with SE-361, K-1044R, and Silastic S2096. It appears that as the filler loading is increased the resistance of the materials to immersion in high temperature water is decreased. This is not always shown by only those properties reported in the tables but also by considering the general condition of the materials such as their brittleness, tackiness, etc.

Effect of Post Cure. A comparison of the same elastomers which differ only in the amount of post cure (Silastic S2071 B-1 and B-2, and K-1047R B-4, B-5, B-6 and B-2) shows that a full post cure is necessary to achieve the maximum amount of high temperature water resistance. In compounds which either have little or no post cure, the hardness is increased during exposures at the lower temperatures. In effect, it appears that high temperature water immersion is effecting some degree of post cure.

Effect of Curing Agent. The materials to be compared in regard to curing agents are Silastic S2081 with S2071 B-2, and K-1047R B-2 with K-1047R B-3. It has been noted above that radiation cured silicone elastomers are superior in their resistance to immersion in high temperature water. Work with the conventional peroxide catalysts was limited and it appears difficult to draw specific conclusions with the little data obtained in Table IV.

The silicone rubbers taken as a class vary to extremes in their resistance to immersion in sealed systems of high temperature water. The radiation cured materials with peroxide catalyst eliminated appear to

be superior in their resistance, with the methyl vinyl types ranking second. The other types of silicone elastomers appear in general to be unsuitable for use under such conditions.

Damage for all types of silicone elastomers appears to be immediate and more affected by temperature increases than by time of exposure. After prolonged exposure at the higher temperatures all of the silicone rubbers examined decreased in hardness and tensile strength. For applications requiring silicone elastomers for use in high temperature water such as seals, for example, it appears that maximum exposure to air on available surfaces would offer optimum performance.

Styrene Rubber. Only one material in this class, PR 408-70, was evaluated. It does not appear suitable for use in high temperature, as all properties were reduced considerably and the material swelled.

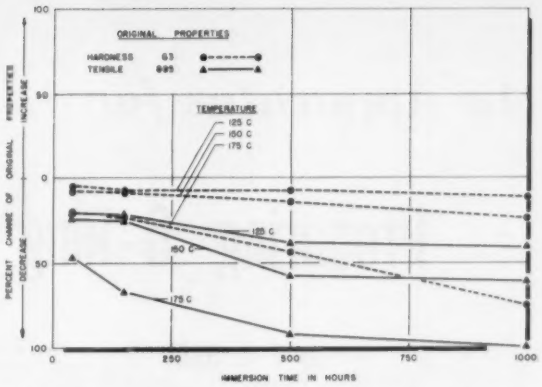

FIG. 7—Change in properties of SE-361 methyl vinyl silicone elastomer induced by immersion in high temperature water for various periods of time.

Summary

Physical property changes induced by immersion in both boiling water and high temperature water have been presented for a great number of classes of elastomers, as well as for materials within the classes. Each material, because of space limitations, could not be treated individually and the reader is urged to make his own comparisons or examinations on those materials in which he has an interest. The following remarks summarize in general the results of the studies presented here.

Boiling Water Immersions. Results of the tests where discs were immersed for 1000 hours in boiling water and tensile specimens were immersed for 2000 hours indicate that many of the classes of elastomers investigated are suitable for use in boiling water. Because some of the classes of elastomers were represented by many compounds, and others were represented by only a few materials, it is difficult to rate the classes. For example, there may be better natural rubber compounds than the one studied. Classes of elastomers which appear suitable for use in boiling water are: neoprenes, Hypalons, Vitons, nitriles, silicone and styrene rubbers. Classes which are definitely not suited are the acrylics and urethanes. The other classes of elastomers appear questionable.

High Temperature Water. Immersion in high temperature water in sealed systems is very damaging to elastomers. Even those materials which showed up best underwent considerable property change. Here, as in the case of the boiling water tests, it is difficult to rate the materials according to their superiority. Rubbers which appear suitable for use in high temperature water are nitriles, Vitons, methyl vinyl silicone rubbers and radiation cured silicone rubbers. Generally speaking, most materials became softer, lost much of their strength, and swelled.

General. All of the tests reported here show that there are essentially two factors which determine the resistance of a material to immersion in hot water. The first is the base polymer itself, while the second is the manner in which the polymer is compounded, which includes the curing agents, filler loading system, etc. The data given here also indicate that there is little or no correlation between the results of a material immersed in boiling water and the manner in which it is affected by immersion in high temperature water.

For example, the radiation cured silicone rubbers did not appear better than their peroxide cured counterparts in boiling water, while they were definitely superior with respect to their resistance to immersion in high temperature water. Also, there appears to be little difference as to the type of water used for the immersion studies. Although pressure build up in the high temperature immersion reactors was not recorded in testing all materials, spot checks and ease of disassembly indicated that little or no pressure in addition to the saturated water pressure was built up during these tests.

As was indicated previously, because the classes of elastomers were not covered comprehensively, the statements made here are to be considered general in nature and the data are offered chiefly for background and engineering information on its own merits.

ACKNOWLEDGMENT

Acknowledgment is made to the various suppliers of materials for their cooperation in submitting test samples and pertinent materials information. It should be noted that many of the materials evaluated might never have been developed or intended by the manufacturers for the conditions to which they have been subjected. Any failure or poor performance of a material is not necessarily indicative of the utility of the material under less stringent conditions or for other applications.

Acknowledgment is also made to F. M. Newby of the Irradiation Processing Department, Hanford Atomic Products Operation, General Electric Co. for his assistance in carrying out the irradiations.

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An Apparatus for

Preparing O-Ring Tensile Specimens

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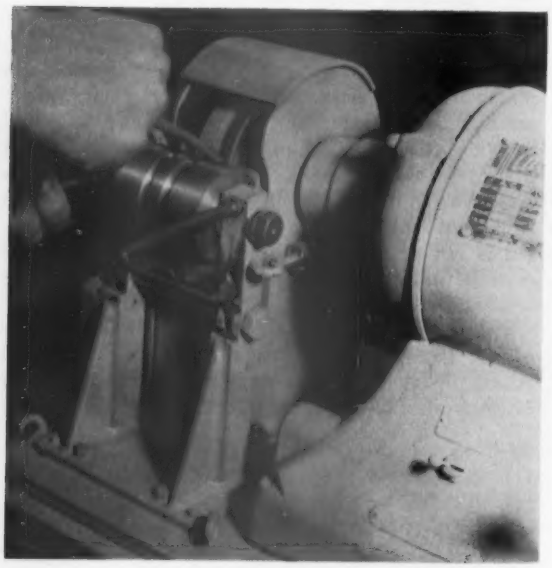
THE MATERIAL LABORATORY, New York Naval Shipyard was authorized by the Elastomers Branch under the direction of T. A. Werkenthin of the Bureau of Ships, Navy Department, Washington 25, D. C. to evaluate O-rings intended for use as seals on cylinder liners of diesel engines. These O-rings, with a cross-section diameter of 0.240 to 0.275-inch and an internal diameter of about 12 inches are much too long to be tested as intact rings on the usual Scott tensile machine.

In view of the disadvantages of testing specially prepared small O-rings, molded sheets and pieces cut from an O-ring, the Laboratory built an apparatus to grind pieces cut from these O-rings into rectangular strips suitable for preparing dumbbell type tensile specimens. This apparatus, shown in the accompanying illustration, is basically the same as that described in a previous article (S. A. Eller and W. K. Gondek, "A Laboratory Grinding Machine for Preparing Test Specimens from Rubber and Other Flexible Products," *ASTM Bulletin,* May, 1955) except that a roller with two semicircular grooves machined in the surface is used in lieu of a flat roller.



Grinding machine with a sample of O-ring material positioned to grind a flat surface onto it.

In operation, the lower part of a six inch long section cut from the O-ring is inserted in the clearance space between the groove in the roller and the grinding wheel. A flat surface is ground on this part as the roller is tilted with one hand to force the O-ring against the grinding wheel while simultaneously the O-ring material is pulled clear of the wheel with the other hand. During the grinding operation, the O-ring material is pressed into the groove and is thereby restrained from twisting or turning. The section of O-ring is then turned bottom to top, the lower part again inserted between the roller and wheel, and the grinding operation continued, care being taken to position the O-ring material in the groove so that the flat surfaces ground from both ends are overlapping. The O-ring material is then turned around and its flat surface placed against a flat part of the roller to grind a flat surface onto the other side. Thereafter both sides are ground alternately to obtain a rectangular strip of the desired thickness at the approximate mid-portion of the O-ring material.

A Type IV die (Method 4111, "Tensile Strength," Federal Test Method Standard No. 601, April 12, 1955) can then be used to cut dumbbell type tensile specimens from the ground strips of O-ring material. During this cutting operation the strips are held under slight tension to keep them straight.

It should be noted that the above apparatus permits the determination of the tensile properties of dumbbell type specimens cut from the actual O-rings offered for delivery. Offsetting the cost of their preparation is the fact that several specimens can be prepared from one O-ring, thereby reducing the number of O-rings required for evaluation.

ACKNOWLEDGMENT

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EDITORIAL

Cold War Export Policies

► The daily press on January 28, 1959, carried stories to the effect that the West German government had signed an agreement with the Soviet Union providing for the shipment of steel pipe in the amount of $18 million dollars by three Ruhr companies. The Soviet Union had been negotiating with U. S. authorities for the purchase of the pipe. On January 20, however, a spokesman for the Department of Commerce disclosed that our government had refused an export license.

In July of 1958, a similar matter came to our attention. In this case, an American company had been invited to bid on a subcontract with a British firm that had contracted to build a tire plant in Russia. After some eighteen months of vacillation by the Commerce Department, the contract was finally awarded to an English company.

Of course, if the actions in both cases were calculated to fortify the defense posture of the Free World, we would have small cause to comment on the situation. In effect, however, the refusal by the Commerce Department to permit American concerns to participate in foreign business serves no purpose other than to throw that business elsewhere. When we further understand that many of the countries of the Free World who gain foreign business are sustained in great measure by U. S. funds, the error is compounded indeed.

It is difficult to comprehend the attitudes of some government agencies where business and trade are concerned. There have been, it seems to us, too many of these cases and some clarification of purpose is indicated. The function of a government agency should be to facilitate and assist. What we are getting is red tape and confusion.

While we cannot govern the export policies of our sister countries in the Free World, we can ourselves take a more realistic attitude toward the facts as they exist. We did not sell steel pipe to the Soviets—but the West Germans did. We did not sell products or services to the Russians for the construction of a tire plant—but the British did. The Soviet Union now has the pipe and it has the tire plant, what do we have?

At the time when the tire plant case came to light many of our Representatives and Senators called for a new "look see" at our export policies. So far, we have neither looked nor seen. May we suggest that time is passing us by. Let us take another look at our export policy—now!

Special Industry Report

Some Pointers on

SBA LOANS

Questions and answers on loan policies of the Small Business Administration

IN RESPONSE to a number of inquiries about loan policies of the Small Business Administration, RUBBER AGE commissioned Larston D. Farrar, noted Washington business writer, to interview SBA officials and report their verbatim answers. The editors think that what he found is of interest to many small businessmen who are seeking financing for various reasons under the most advantageous terms. What he found out about getting a loan from the SBA is reported herewith.

QUESTION: What type or types of loans are available from the Small Business Administration, and which businessmen are eligible?

ANSWER: Small Business Administration loans are available to small companies in the manufacturing, wholesaling, retailing and service fields. Publications, as such, are barred from SBA loans, but writers, advertising agencies, printers and book and magazine distributors are eligible.

There are four types of SBA loans. These are: (1) participation; (2) direct; (3) limited loan participation, and (4) disaster.

A "participation" loan is one made jointly by the Small Business Administration and banks or other private lending institutions. Two-thirds of the agency's loan approvals are in this category. In many cases of bank-participation loan agreements, the bank will assist the potential borrower with the filing of the loan application. If not, the potential borrower should visit one of the SBA field offices, discuss his need with a financial specialist and obtain the proper loan forms.

A "direct" loan is one in which there is no bank participation. All of the funds are advanced by the Government. It is the policy of the SBA to make direct loans only after the possibility of negotiating a bank-participation agreement has been exhausted. The SBA will *not* make any type of loan, direct or participation, until the potential borrower has tried to obtain a regular bank loan. By law, the Small Business Administration can make loans to small firms only when financing is not otherwise available to them on reasonable terms. The small business owner therefore should first seek a needed loan from his local bank, or other local source of financing.

If the private lender will not make the loan by itself, but is willing to do so if the SBA agrees to participate in it, the businessman may apply for a bank-SBA participation loan. If the bank will not make a loan even with the Small Business Administration participation, the businessman then may apply for a direct loan from the SBA. His application *must* be accompanied by a letter from the bank stating that it is unable to make the loan. If the businessman's firm is located in a city of 200,000 population or more, his application to the SBA must be accompanied by letters from two banks stating that they cannot grant the requested loan.

A "limited loan participation" loan is designed especially to assist small retailers, wholesale distributors and service estabishments, although other types of business loans are also available to them. As a rule, small concerns in these fields have very little in the way of tangible collateral which they can pledge for a loan. However, they often have a good earnings record, competent management, and a creditable record with local banks for meeting their obligations. Under this plan, the SBA will participate with a bank in a loan to a firm up to a maximum of $15,000, or 75 per cent of the total amount of the loan, whichever is the lesser. Generally, the participating bank's share in the loan must represent additional exposure on the part of the bank equal to not less than 25 per cent of the total amount of the loan. The maximum maturity on limited loan participation agreements is five years. Maturity on other types of SBA loans may be as long as ten years. The method for obtaining a limited loan participation agreement is the same as for any other type of bank-participation loan.

A "disaster" loan is made to businessmen, home-owners, and individuals, in areas designated as disaster areas by a Federal Agency, for any of a number of reasons. These are low-interest loans —three per cent—made to tide over those stricken by disaster until they can get on their feet. Strictly speaking, any citizen in a disaster area can get a disaster loan, if he can show that his difficulties are due primarily to the flood, hurricane, or other catastrophe which has struck the area.

QUESTION: Do I have to show evidence that a private lending institution has refused the loan?

ANSWER: If the bank will not make a loan, even with the Small Business Administration participation, the businessman then may apply for a direct loan from the Small Business Administration. His application must be accompanied by a letter from the bank stating that it is unable to make the loan. If the businessman's firm is located in a city with a population of 200,000 or more, his application to the Small Business Administration must be accompanied by letters from two banks stating that they cannot grant the requested loan.

QUESTION: Is it any easier to get a Small Business Administration loan if I can arrange for partial private financing?

ANSWER: Naturally, if a local bank, which is familiar with a small firm's credit record and its day-to-day operations, is willing to share in a Small Business Administration loan to the firm, this helps to assure the Agency that the loan is a good risk. Further, since the bank has done a large part of the necessary credit investigation before the loan request is submitted to the Small Business Administration, the Agency usually can process this type application more quickly.

QUESTION: What are the maximum amounts available to me?

ANSWER: The amount which you may borrow from the Small Business Administration depends upon how much you need to carry out the intended purpose of the loan. However, under the Small Business Act of 1953, which created the Agency, the largest loan the Small Business Administration can make to any one borrower is $350,000. This is the maximum both for a direct Agency loan and for the Agency's share of a participation loan.

The SBA is authorized to make loans of more than $350,000 to groups of small firms which have formed a corporation to produce or obtain raw materials or supplies. In the case of these so-called "pool loans," the maximum amount is $350,000 multiplied by the number of small firms which have formed the corporation.

QUESTION: What are the terms of repayment on a loan?

ANSWER: The Small Business Administration's business loans generally are repayable in regular installments, usually monthly including interest on the unpaid balance. General business loans may be for as long as ten years, loans under the limited loan participation plan for a maximum of five years, and pool loans for a maximum of twenty years.

The interest rate on the SBA's direct business loans has been set by the Agency's loan policy board at 5½% per annum. In participation loans, the private lender may set the rate of interest on the entire loan, provided it does not exceed 5½% per annum. The interest rate on the Agency's pool loans is 5% per annum.

QUESTION: Do I need Government contracts to be eligible for a loan?

ANSWER: Not at all, although the Agency does, of course, make loans to small firms which need working capital to carry out Government contracts.

QUESTION: How long must I wait, normally, for action on a loan?

ANSWER: The SBA acts promptly on all applications and in most cases a decision can be given within about three weeks. However, the time required to process a particular application depends in part upon the care with which the businessman has prepared his loan request, the completeness of the information he has furnished, and the amount of work necessary for the SBA to give full consideration to all elements of the application.

As pointed out previously, the Agency generally can act more quickly on an application for a participation loan than on one for a direct loan, since the bank provides the SBA with much of the necessary credit information.

QUESTION: How can I determine whether I qualify as a small business?

ANSWER: There are two important considerations here. First, as defined in the Small Business Act, your firm must be independently owned and operated and not dominant in its field. Second, you must meet the SBA's criteria in regard to dollar volume of business. In general, the Agency classifies a wholesale concern as small if its yearly sales are $5,000,000 or less, and a retail or service trades firm as small if its yearly sales or receipts are $1,000,000 or less.

QUESTION: What sort of records and information will I need to present?

ANSWER: In considering an application for either a participation or a direct loan, the SBA will want the same kind of information that a bank needs when weighing a loan request. The Agency will want to know the proposed purpose of the loan; your financial condition; how you propose to repay the loan, and the available collateral.

QUESTION: Where do I go to apply for an SBA loan? Whom do I see?

ANSWER: As indicated, you should first see your local bank about a bank loan, or a bank SBA participation loan. If the bank cannot extend the financing on its own, or in participation with the SBA, you may then apply to the Agency for a direct Government loan. The local bank probably can give you the address of the nearest of the SBA's 37 field offices, which are located in major business centers across the nation. Or, if you live in or near a large city, you might check the U. S. Government section of its telephone directory to see if a Small Business Administration office is located there. Of course, if you prefer, you can obtain the address of the nearest field office through written inquiry to the Small Business Administration, 811 Vermont Ave., N. W., Washington 25, D. C.

QUESTION: Can I use part of an SBA loan to pay off a first mortgage against my place of business? Can I use a part of such a loan to liquidate other indebtedness against my business?

ANSWER: In general, the SBA will allow the use of proceeds of one of its loans to pay off a first mortgage against a property only when the mortgage has already been substantially repaid and only a relatively small part of it remains due. In such cases the funds may be used to pay off the first mortgage holder and the SBA will then take a first mortgage as collateral. If the prospective borrower has a first mortgage on his property that has a long time to run and is on favorable terms, the SBA will not advance funds to pay it off.

Many of the business loans approved by the SBA are used to pay off various types of indebtedness that the businessman has incurred. It is often advantageous to the borrower to consolidate all of his debt obligations in this manner.

QUESTION: Is it possible, instead of obtaining a formal written refusal from a bank or insurance company, that I can have a real estate broker furnish a letter to the effect that specific banks and insurance companies have refused to accept a mortgage loan against my business property?

ANSWER: No. The SBA requires that the prospective borrower first visit his bank of account and discuss the possibility of obtaining a private loan before he can apply for a Government loan. In larger cities he is required to try to obtain the funds from one other bank in addition to his bank of account.

QUESTION: How far back should I be required to submit an operating statement?

ANSWER: Detailed financial statements covering at least three years of operation are usually required, and in some cases the SBA may ask for statements covering the past five years.

QUESTION: Can I make a loan to improve my business structure, expand it, re-equip it and renovate it, or otherwise to make it more modern?

ANSWER: Yes. Many SBA loans are made for these purposes. Loans are made by the SBA to finance business construction, conversion or expansion; to finance the purchase of equipment, facilities, machinery, supplies or materials, and to supply working capital.

QUESTION: If I am turned down by a regional office, can I appeal to the Washington headquarters office?

ANSWER: It is not necessary to make such an appeal since regional offices, while they have authority to approve the smaller SBA loans, do not have authority to decline them—they can only recommend to the Administrator in Washington that they be declined. Such loans are always reviewed in Washington. When a loan application is declined by the Washington office, the businessman may appeal for reconsideration if he can show that he can successfully overcome the objections that the SBA had for refusing the loan.

ACS Rubber Division Spring Meeting To Feature Sessions on Urethane Foams and Ozone Effects

Interesting Papers Scheduled for May 13-15 Meeting in Los Angeles

► Division of Rubber Chemistry of the American Chemical Society plans to hold its Spring Meeting at the Biltmore Hotel in Los Angeles, Calif., on May 13, 14 and 15. Two symposia, entitled "Symposium on Urethane Foams and Elastomers" and "Effect of Ozone on Rubber" will highlight the four technical sessions. A regular meeting of the 25 year group to be presided over by E. C. Partridge (University of Southern California), will precede the first technical session.

E. H. Krismann, chairman of the Rubber Division, will preside over the first technical session, which will begin at 2 p.m. on Wednesday, May 13. G. T. Gmitter (General Tire) will chair the "Symposium on Urethane Foams and Elastomers." Invited papers, listed here, will not necessarily be delivered in the order given.

"Urethane Polyether Prepolymers and Foams—Influence of Chemical and Physical Variables on Reaction Behavior," by G. H. Scholten, J. G. Schulmann and R. E. Tenhoor (Dow Chemical).

"Organo-Tin Compounds as Catalysts for Reaction of Isocyanates with Active Hydrogen Compounds," by F. Hostettler and E. F. Cox (Union Carbide Chemical).

"Some Properties and Applications of Loaded Flexible Urethane Foams," by S. J. Assony (Freedlander Research & Development) and S. Chess (American Latex).

"Rigid Urethane Elastomer Vulcanizates," by R. J. Athey (DuPont).

"The Development of Cast Urethane Elastomers for Ultimate Properties," by K. A. Piggot, B. F. Frye, K. R. Allen, S. Steingiser, W. C. Darr, J. H. Saunders and E. E. Hardy (Mobay Chemical).

"Mechanism of the Water Reaction with Isocyanates," by G. Shkapenko, G. T. Gmitter and E. E. Gruber (General Tire).

Invited papers for the Symposium on "Effect of Ozone on Rubber," to be presided over by H. A. Winklemann (Dryden Rubber), include:

"Operation of Ozone Chambers in Rubber Laboratories to Minimize Variation in Test Results," by Maurice Lowman (Goodyear).

"Ozone Resistance of Rubber Insulations," by W. H. Couch, G. H. Hunt and O. S. Pratt (Simplex Wire and Cable).

"Weather Aging of Elastomers on Military Vehicles," by E. J. Kvet, Jr., J. A. Krimian and R. H. Heinrich (Detroit Arsenal).

"Chemical Inhibition of Ozone Degradation of SB-R," by H. W. Kilbourne, G. R. Wilder, J. E. Kanverth and J. O. Harris (Monsanto Chemical).

"Ozone Cracking in the Los Angeles Area," by J. W. Haagen-Smit (Consultant).

"Factors Influencing the Ozone Resistance of Neoprene Vulcanizates Under Flexure," by R. M. Murray (DuPont).

Contributed papers for the technical session on "Effect of Ozone on Rubber" include:

"Comparative Performance of Antiozonants in Road and Accelerated Tests in the Los Angeles Area," by Frank B. Smith (Naugatuck Chemical).

"Wingstay 100 as an Antiozonant," by J. C. Ambelang and B. W. Habeck (Goodyear).

"Correlation of Ozone Chamber and Outdoor Exposure," by H. A. Winklemann (Dryden Rubber).

"Accelerated Aging Tests and Outdoor Performance of Butyl Rubber," by D. R. Hammel and W. W. Gleason (Enjay Laboratories).

"The Ozone Resistance of Styrene-Butadiene Rubber at Low Temperature," by R. F. Grossman and A. C. Bluestein (Anaconda Wire).

During the spring meeting the Best Paper Award will be given to authors of the best paper presented at the Chicago meeting. Past-chairman F. R. Dunbrook will make the award. There will also be two sessions for general or contributed papers. Members of the Rubber Division have been requested to submit seven abstracts of their papers for inclusion in the program for presentation before the Division. The Best Papers Committee will select the best paper.

Deadline for abstracts will be March 19, 1959. The seven abstracts should

be submitted to the secretary. In the letter of transmittal, the authors should give the name of the laboratory in which the work was done; who will deliver the paper; and how much time is requested. At least one of the authors should be a member of the A. C. S. Associate membership in the Rubber Division does not constitute membership in the A. C. S.

Abstracts should answer three specific questions: (1) Why was the work undertaken? (2) What were the results? and (3) Do you think the results will be useful to chemists and chemical engineers and of general significance to science? Six copies of the paper ready for publication (not lectern copies) are to be handed to the secretary at the meeting before or immediately after presentation.

The Executive Committee will also convene to select the recipient of the 1959 Charles Goodyear Medal. Any member of the Rubber Division may send his nomination of a person who has made a valuable contribution to the science or technology of rubber or related subjects to the secretary on or before April 1, 1959.

The nomination must include the name of the candidate; statement of contribution of the candidate for use of the award citation; statement concerning the importance of his contribution; pertinent publications (only those relating to high polymers and only those which support the contribution); biography including date and place of birth, education and awards, and positions held; and name of proposer.

The Rubber Division has also announced that plans are underway for the International Rubber Conference to be held in Washington, D. C., on November 8 to 13, 1959. A total of 75 titles have already been received from 12 countries, 26 of them overseas. The number of papers concerned specifically with natural rubber is about equal to those on synthetic rubber.

Isocyanate Price Reduced

► National Aniline Division, Allied Chemical & Dye Corp., New York, N. Y., has announced a 50c per pound price reduction from $1.75 to $1.25, for "Nacconate 300," a basic isocyanate used in making solid urethane rubber, elastomers and coating. Simultaneously, "Nacconate 1300-50C," a solution of Nacconate 300, was reduced 14c from $1.00 per pound to 86c per pound. This material is used primarily in the manufacture of urethane adhesives. The company reports that recent developments in urethane coating technology indicate an expanding market for Nacconate 300, Allied's trade name for diphenylmethane 4,4′ diisocyanate (MDI). Tests show that urethane coatings based on Nacconate 300 have improved dry time, greater hardness and superior gloss retention.

Charles H. Rybolt

Elected Vice-President

► Wallace & Tiernan Inc., Belleville, N. J., has announced the election of Charles H. Rybolt as vice-president, Chemical Divisions. Mr. Rybolt has been associated with Wallace & Tiernan since 1941. Prior to his promotion he was director of the Chemical Divisions and general manager of the Lucidol Division. He is a member of the American Chemical Society and the Society of the Plastics Industry.

H. D. Pettibone Retires

► Holman D. Pettibone has announced his retirement as board chairman of the Chicago Title & Trust Co. after 47 years with the firm. In 1953, Mr. Pettibone was named chairman of a three man commission to dispose of facilities the Federal government had built during World War II. He became widely known to rubber company executives by virtue of his job of selling Government built synthetic rubber plants to private industry. His final report to the Government in 1956, showed that he sold the plants for some $23 million more than they cost. In 1957, he took on the chairmanship of a special committee to advise on the stockpiling of critical war materials including natural rubber.

Medcalf Is Named Manager

► Eugene C. Medcalf has been named manager of the Intermediates Department of American Cyanamid Co., New York, N. Y. He will have over-all responsibility for the marketing of all intermediate products of the company and his office will be in the department's headquarters at Bound Brook, N. J. Mr. Medcalf, who joined Cyanamid in 1933, has served the company in research, production and managerial capacities, primarily in the intermediates field. A graduate of Indiana University, he is a member of the American Chemical Society and the American Institute of Chemical Engineers.

U. S. Rubber Realigns Personnel

► U. S. Rubber Co., New York, N. Y., has announced that an exchange of executive responsibilities has taken place in the Tire Division as a part of the company's management development program. In the move, designed to broaden the experience of management personnel, Walter F. Brown, currently general sales manager of the U. S. Tires Division, and Herbert D. Smith, director of automotive sales, will assume each other's duties. As general sales manager of the U. S. Tires Division, Mr. Smith will be responsible for replacement sales of U. S. Royal tires and other automotive products of the division, while Mr. Brown will direct original equipment sales of tires, tubes and air springs to the automotive industry.

The company also has announced that it is combining sales responsibilities for coated fabrics and foam rubber cushioning in a move designed to give better service to furniture manufacturers and distributors. William J. Mulvey has been named sales manager of the newly combined departments, responsible for sales of Koylon foam seating as well as Naugahyde upholstery and other coated fabrics. Charles H. Baldwin has been appointed sales manager of Koylon foam seating. John Brady was promoted to sales manager of coated fabrics made in Mishawaka, Ind., and Thomas Martin continues as sales manager of coated fabrics made in Stoughton, Wisc.

Five regionel sales managers of Koylon foam seating, Naugahyde upholstery and other coated fabrics also were named. They are: Jack L. Bonnell, West Coast; Robert Gardner, central region; Joseph P. Gavin, Midwest; Edgar J. Artesani, South, and Earl Kochersperger, East.

Firestone Adds New Tire Size

► Firestone Tire & Rubber Co., Akron, Ohio, has announced the addition of a ninth tire size to its line of tubeless tires for imported cars. The new tire, a 5.0-15, is designed for the French built Renault Dauphine and is made in both black and white sidewalls. The nine tire sizes now in the Firestone line cover approximately 95 per cent of the foreign made cars operating in the U.S. All of the tires are manufactured in this country.

Parker-Hannifin Names Three

► Parker-Hannifin Corp., Cleveland, Ohio, has announced three executive changes at its Parker Seal Co. Division, Culver City, Calif. Paul F. Smith, general manager of Parker Seal, has been named president of the division; Scott A. Rogers, assistant general manager, becomes vice-president; and T. J. McCuistion, sales manager, has been appointed vice-president, sales.

Main Control Room in Reactor Building.

70,000 Ton SBR Plant On Stream in England

International Synthetic Rubber Co. Opens Modern New Facility at Hythe

► Great Britain's first venture into the bulk manufacture of general purpose synthetic rubber is the new 70,000 ton-per-year capacity plant of the International Synthetic Rubber Co., Ltd., at Hythe, on Southampton Water, England. The plant, occupying a 54 acre tract, is designed to produce general purpose butadiene-styrene copolymers through a low temperature, cold emulsion polymerization reaction. The main ingredients of the SBR, butadiene and styrene, are used in the ratio of three parts of butadiene to one part of styrene.

The butadiene requirements are met by the Fawley refinery of the Esso Petroleum Co., Ltd., located approximately two miles from the Hythe plant, and is piped between the two installations. The styrene suppliers are Forth Chemicals at Grangemouth and Shell at Partington, and the styrene reaches the plant by rail, road and sea.

The manufacture of synthetic rubber at Hythe is a four stage process. The first operation is solution make-up, in which the various materials are either dissolved or emulsified in water. The second operation — polymerization — takes place continuously and is the fundamental reaction. This is the stage at which the main intermediate product, synthetic rubber latex, emerges.

The next operation deals with the treatment of the latex to recover that proportion of raw butadiene and styrene which remains unused after formation of the latex. The final process converts the latex into solid rubber by coagulation, washing, drying and baling. The rubber is then wrapped in polyethylene film, packed in paper bags or other containers, and stored in the warehouse which has a 3,000 ton capacity.

At present, there are three grades of SBR in production under the brand name of "Intol". They are Intol 1500, Intol 1502 and Intol 1710. Grades where the number begins with "15" denote a straight polymer. Where the first number is "16", a masterbatch is indicated, while "17" denotes an oil-extended polymer.

Steps Required

The various solutions required for the polymerization reaction are made up in the solution make-up area and then, together with the butadiene and styrene, charged to the reaction system. When a predetermined proportion of the monomer charge has been reacted, the polymerization is short-stopped and the resulting latex passes to the recovery system where the unreacted butadiene and styrene are removed from the latex. The stripped latex is then blended and oil extender, if required, is added as an emulsion. The next step is the coagulation of the latex to yield a slurry of rubber in aqueous liquor. This slurry is filtered and washed, and the crumb is dried and finally compressed into bales.

Solution Make-Up

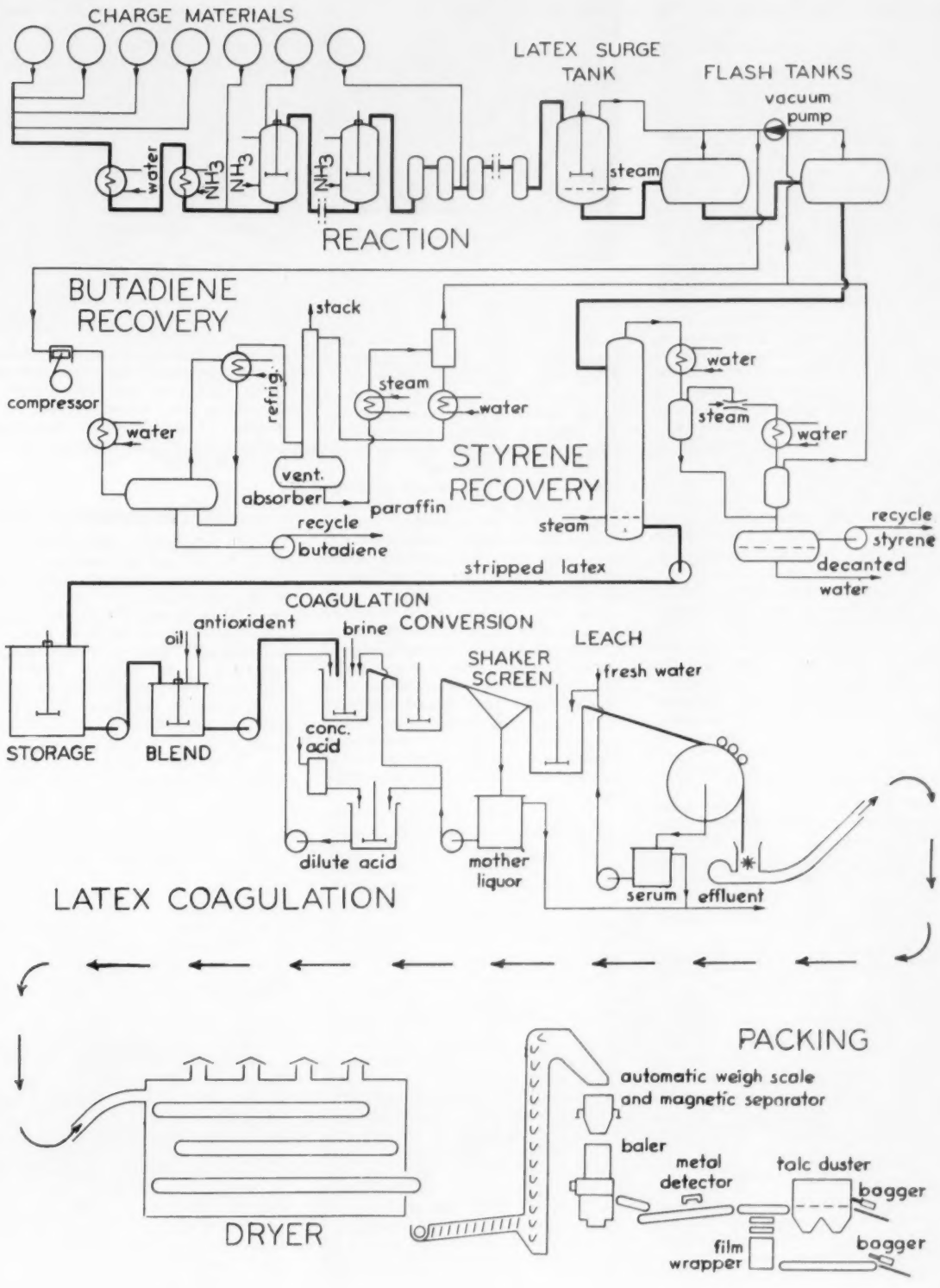
The ingredients necessary during the polymerization and finishing processes are prepared on the upper floor of the solution make-up building and passed to holder tanks via chutes. Fresh butadiene is blended with recycle butadiene with the excess butadiene being returned by pipeline to the refinery for repurification. The blended butadiene is pumped from the tank farm through a scrubber to remove the inhibitor and then through surge tanks and metering systems to the reactor train.

Fresh styrene is blended with recycle styrene and the resulting blend is pumped from the tank farm through surge tanks and metering systems to the reactor trains. The emulsifier solution for the reactors is prepared with rosin soap or fatty acid soap, and other materials being dissolved in water together to form the emulsifier solution, which is pumped through metering systems to the reactor trains. The activator solution is prepared and is similarly pumped to the reactor train, with the modifier being pumped to the trains by metering pumps. A similar procedure is followed for the catalyst.

There are two lines of reactors so that two different kinds of synthetic rubber can be manufactured simultaneously. Each reactor line consists of 11 vessels. The butadiene, styrene and soap

Lines of pipetrack from the refrigerator building to storage tank area.

Flow Chart of Operations at International Rubber



solution are injected into the first vessel for the emulsification process, with the necessary catalyst, modifier and antioxidant added.

Emulsification takes place automatically in the first reactor from which the mixture passes out through the top into the bottom of the second reactor, and so on to the end.

Polymerization

The butadiene, styrene and other solutions are combined together in a single charge pipe which passes first through exchangers cooled by sea water and then through exchangers cooled by refrigerated ammonia. The outlet temperature of the charge stream from these is adjusted as may be required for the polymerization reaction. At this stage, the activator is added to the charge stream and the solution enters the first of the train of reactors in series.

The whole polymerization operation is continuous and the rate is controlled by varying the amount of activator solution and catalyst solution charged. The plasticity of Mooney viscosity of the polymer is controlled by the amount of modifier charged. At the end of the reaction, the latex is led through a series of cylinders, and at this stage the "shortstop" is added to prevent further reaction in the latex. At Hythe, sodium dimethyl dithiocarbamate is used.

The latex then passes to any one of six latex surge tanks where it is heated by the direct addition of steam. This raises the temperature of the latex and so increases the vapor pressure of the unrecovered monomers. The recovery of these monomers is thus facilitated when the latex passes to the recovery area.

Recovery Procedure

The hot latex from the latex surge tanks passes first to pressure flash tanks where the majority of the butadiene is removed, and then to the vacuum flash tanks where the remainder is removed. The butadiene vapor is compressed and condensed and pumped to the recycle butadiene storage tank.

The partially stripped latex now goes to the styrene stripping columns where, by a process of steam stripping under vacuum, the unreacted styrene is removed. The styrene vapor is condensed and the styrene, separated from the water by decantation, is pumped to the recycle styrene storage tank. The latex is now completely stripped and passes to one of the stripped latex storage tanks.

Finishing Operation

The blended latex from the storage tanks is pumped to one of four blending tanks and at this stage oil emulsion may be added to the latex if it is required to produce oil extended rubber. An antioxidant is also added in emulsion form to protect the rubber after coagulation when the wet crumb is being dried. The latex now passes to the coagulation stage which takes place under conditions of vigorous agitation. The resulting crumb and serum overflow into a second agitated vessel known as the soap conversion tank.

Shaker screen operation after coagulation stage.

From this tank the slurry overflows to a vibrating screen where the serum and coagulum are separated. The coagulum falls from the end of the vibrating screen into a reslurry tank where it is then washed by the addition of dilute filtrate from the filters.

The slurry overflows to a rotary vacuum filter where the aqueous phase is removed partially by the action of the vacuum and partially by the action of externally applied squeeze rolls. The cake of rubber then formed discharges to a hammer mill where it is broken down once more into discrete crumbs. The crumbs are fed pneumatically to the top conveyor of a three conveyor drier.

From the discharge of the driers the rubber is fed to balers which produce an 80 pound bale of rubber. The plant capacity is handled in the finishing area by four trains of equipment in parallel: four coagulation tanks, four rotary vacuum filters, four driers, and so on until the baling stage is reached when two train operation is once again resumed.

Monitoring System

The entire operation is monitored from a control room where the state of operations can be seen at a glance on a large board. The controller can see how much butadiene or styrene is contained in any particular tanks, its level and degree of purity. The board also shows the level of the latex storage tanks; the type of rubber that is being made in each of the two reactor lines; the Mooney figure and solids content; the type and level and other data concerning the four blend tanks and the progress of their contents into any one of the four driers.

Morgan Named Sales Manager

► Goodrich-Gulf Chemicals, Inc., Cleveland, Ohio, has named Samuel D. Morgan sales manager responsible for all national sales activities concerning Ameripol rubber. The company also has announced the appointment of Guthery W. Drake to succeed Mr. Morgan as manager of sales operations directing production scheduling activities, marketing research and sales analysis. Mr. Morgan joined B. F. Goodrich in 1942, and in 1944 became comptroller-treasurer of the Hycar Chemical Co., a Goodrich affiliate. In 1946, he left the company to accept a position with the Government, in Washington, where he served as director of sales in the Office of Synthetic Rubber until 1955, when he became associated with Goodrich-Gulf. Mr. Drake served with both state and federal governmental services and private concerns, including Goodrich Chemical, before joining Goodrich-Gulf in 1958. He has B.S. and M.B.A. degrees from Ohio State University, and is a member of the American Marketing Association and the American Statistical Association.

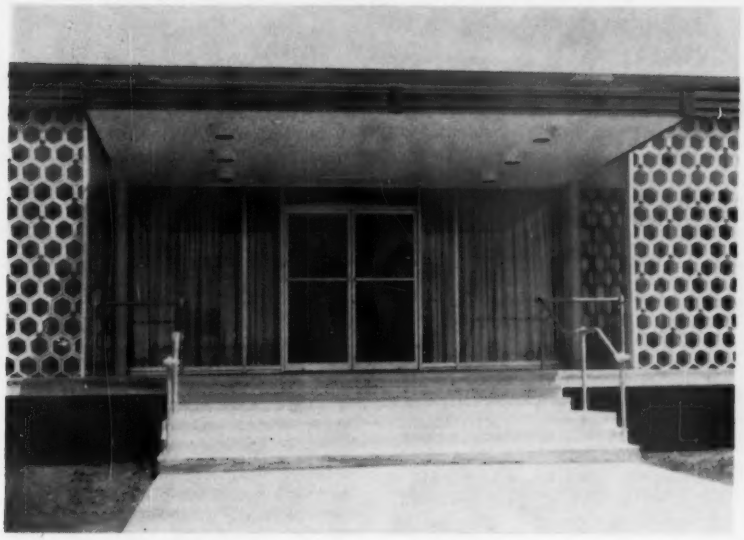
Found Telecommunications Award

► Bell Telephone Laboratories, New York, N. Y., and the American Institute of Electrical Engineers, New York, N. Y., have announced the establishment of the Mervin J. Kelly Award for achievement in the field of telecommunications. With the First Award scheduled to be made in 1960, the award will be made annually by AIEE to an individual who has made an outstanding contribution to the advancement of the art of telecommunications. The prize will consist of a bronze medal, a cash stipend of $1000 and a certificate. Though sponsored by Bell Laboratories, the award will be adminstered solely by the Institute.

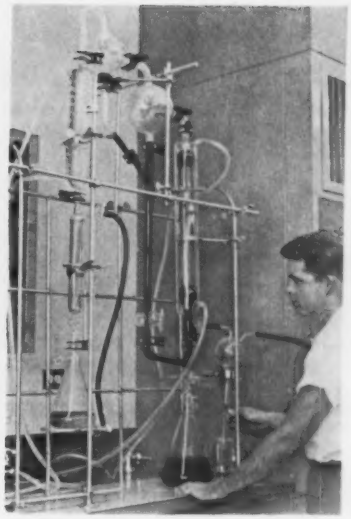
The award was named in honor of Dr. Mervin J. Kelly, formerly president and now chairman of the board of Bell Laboratories, who will retire on March 1 after 41 years of scientific and administrative service with the Bell Telephone System. Dr. Kelly is a Fellow of the AIEE and has been active in Institute affairs for 33 years.

Moves Eastern Sales Office

► Firestone Plastics Co., Pottstown, Penna., has moved its Eastern sales office from 307 Fifth Ave., to 45 Rockefeller Plaza, New York, N. Y. Stuart G. Keiller, manager of the Velon Yarn Division and Charles F. Edelmann, manager of the Velon Film Division, will be located in the new office. In addition to the staffs of these two divisions, the New York representative of the Chemical Sales Division, Harry E. Kellenberger, is also making his headquarters at the new office.



Entrance to the Research Center. Shown also is a section of the building's sun screen, which consists of replicas of Copolymer's trademark arranged in a series.



A stripping unit is used to remove unconverted monomers from small scale latex samples in one of the laboratories.

Copolymer Opens New Research Center

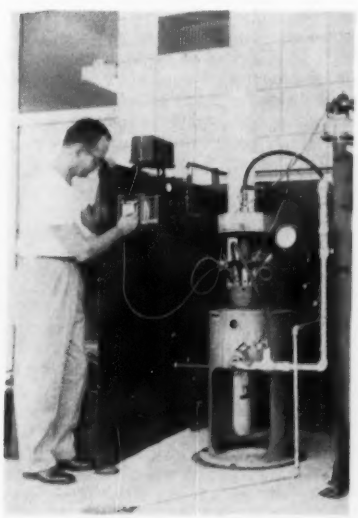
► As reported in the October issue of RUBBER AGE, Copolymer Rubber and Chemical Corp., Baton Rouge, La., has begun operations at its new research building, the center of the firm's basic research activities. The building, which was dedicated on September 25, had been under construction since the beginning of 1958.

Located north of Copolymer's main plant at Baton Rouge, the 180 by 60 foot structure is of modern architecture. Across the front of the unit, is a unique sun screen which consists of replicas of the Copolymer trademark.

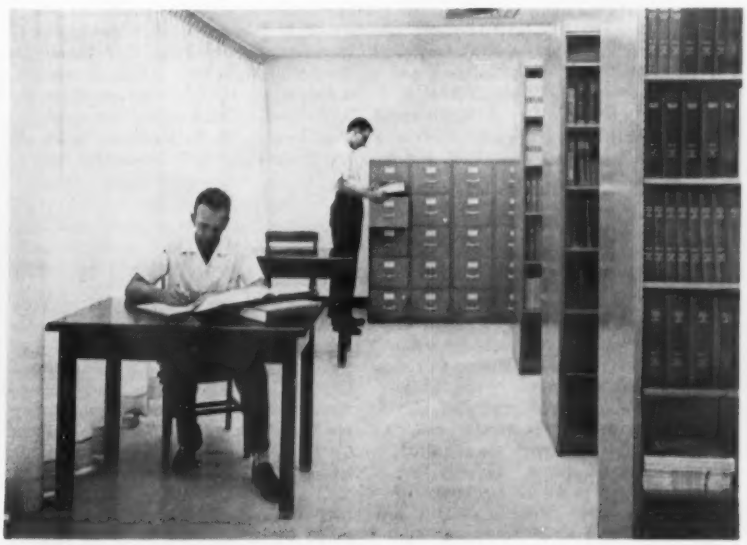
The building contains chemical, polymerization and instrument laboratories; a coffee shop, work shop, and storeroom; a library and conference room for the use of plant personnel; and appropriate office space for supervisory personnel. It is also completely air-conditioned with separate controls for each laboratory. Though the present research staff consists of fifteen members, the building was designed to house a staff of thirty people, the company states.

According to Dr. Paul G. Carpenter, in the past, Copolymer emphasized development activities and conducted these activities on a very high level. To achieve the same high standards for research, it was necessary that the corporation broaden its program with increased emphasis on basic research.

A. K. Walton, president of the firm, stated at the dedication ceremonies, "the new Research Center represents an investment in the future of the company and the community. The years ahead hold every promise of continued growth and accomplishment . . . and the key to this progress lies greatly in research and development."



High pressure autoclaves conduct polymerizations or special reactions at pressures to 1000 pounds a square inch.



The Research Center's modern library affords an ideal place for reference work and study. It is available to all employees who have technical problems to solve.

Lowell Joins Dewey & Almy

► Harry N. Lowell has joined the Organic Chemicals Sales Department of the Dewey & Almy Chemical Division of W. R. Grace & Co., Cambridge, Mass., where he will assist Charles E. Brookes, sales manager, in special projects. Mr. Lowell was formerly a member of the division's Marketing Research Department, specializing in organic chemicals. He has also served the Commercial Research Department of the Bethlehem Steel Co. Mr. Lowell received a B.S. in business administration from the Massachusetts Institute of Technology in 1951. He is a member of the Boston Chapter of the American Marketing Association.

Acquires Freitag Assets

► Salem-Brosius, Inc., Pittsburgh, Penna., has announced its purchase of the plant and assets of R. H. Freitag Manufacturing Co., Akron, Ohio. With the acquisition of Freitag, Salem-Brosius now becomes a supplier of equipment and parts to the rubber, atomic energy, automotive, aircraft, electronics and marine industries. It will be operated as a division of Alloy Manufacturing Corp., a Salem-Brosius subsidiary which makes reactor components. The parent company designs and builds heating and heat treating furnaces for metals industries and manufactures other industrial equipment.

► Raybestos-Manhattan, Inc., Passaic, N. J. recently held a new type of regional and district managers' conference to formulate sales plans for 1959 and discuss how the company can improve service and products for its customers. The conference was held jointly by the Manhattan Rubber and Packing Divisions and attended by members of production and engineering, sales and marketing executives, and officials. The regional and district managers from all parts of the country were indoctrinated with plans and new information so that they in turn can conduct similar conferences in their districts to approximately 100 field representatives. Regional and district managers, sales executives and officials in the photograph are: (Left to right) top row:—E. T. Fair, Jr.; G. S. Himebaugh; F. Hughes; R. B. Park; J. T. M. Frey; B. W. Thomas; S. V. V. Hoffman; C. P. Shook, Jr.; J. M. Ehman; R. L. Calhoun; and W. Pontier. Middle row:—O. R. Kovacs; T. W. Latham; H. P. McLaughlin; E. E. Steinbauer; A. N. Johnston, Jr.; A. A. Ringland; F. A. Miller; J. McKinlay; R. C. Neilson; F. McBrearity; and J. J. De Mario. Bottom row:—R. F. Tooling; S. J. Synnot; W. S. Simpson; H. H. Burrows; R. B. Hazard; J. F. D. Rohrback; A. E. Jackson; A. P. Schneider; and C. V. Vetell.

Huber Offers Polyfil Series

► A series of fine-particle, water-fractionated clays for the reinforcement of natural and synthetic polymers has been introduced by the J. M. Huber Corp., New York, N. Y. Known as the "Polyfils", the new improved grades of clay will have many uses in reinforcement where light, bright colors are required. The water-fractionated Polyfils are "Polyfil C" with a G. E. brightness of 80 to 82 per cent; "Polyfil X" with a brightness of 84.5 to 85.5 per cent; and "Polyfil F" with a brightness of 86 to 87 per cent.

Ohrstrom Purchases Egan Firm

► G. L. Ohrstrom & Co., New York brokerage firm, and a group of associates have announced the purchase of Egan Manufacturing Co., Muskogee, Okla. Included in the purchase of Egan, manufacturer of tires and tubes, are five Egan subsidiaries: Ace Rubber Co.; Oklahoma Cushion Co.; H. B. Egan Co. of Canada; Arrow Printing Co.; and Lucky Strike Patch Co. According to Ohrstrom, the purchase was made for investment purposes and no public distribution of the company's securities is contemplated.

Washington Group To Hear General

► The Washington Rubber Group was to have heard a talk by Brigadier General Richard W. Hayward (USMC-Ret.) at its first meeting in 1959 on February 2 at the Army-Navy Town Club, Washington, D. C. General Hayward's topic, "Strategy for Survival" will be an analysis of the United States' role in recent international crises.

The group has announced that George G. Richey (National Bureau of Standards) has become its new secretary for 1959, succeeding Frank Shew who has moved to Corpus Christi, Texas, to head up the Naval Air Station's rubber laboratory.

On November 4, the group conducted a field trip-meeting to the Western Electric wire and cable plant in Baltimore. Approximately 50 members participated in the tour of the highly automated rubber and plastic coated wire plant. Dinner was served in the plant cafeteria, and at the dinner meeting the group was addressed by Irvin Kolman (Belko Corp.) Mr. Kolman discussed the administrative problems involved in running a small rubber company, stressing that the manager of the small firm, unlike his counterpart in the larger rubber companies, is actually three or four executives rolled into one—plant administrator, purchasing agent, personnel chief and when the occasion demands, hired hand.

New Minnesota Rubber Factory

► Minnesota Rubber Co., Minneapolis, Minn., has announced the completion of a 30,000 square foot addition to its manufacturing facilities. The new building, located at 3631 Wooddale in Minneapolis, will house the Engineering and Tooling Department and will provide space for increased rubber production. The building is a one story structure with provision for the erection of a second story in the future. It is of pre-stressed concrete construction with brick facing to match the existing company building. This addition brings the total manufacturing space to over 180,000 square feet.

Ulmer Named Plant Manager

► B. F. Goodrich Co., Akron, Ohio, has announced the appointment of Stanley T. Ulmer, formerly production superintendent of the company's Akron tire plant, as manager of its Oaks, Penna., tire plant. He succeeds W. L. Carpenter who has been appointed director of B. F. Goodrich Australia, Pty., Ltd., at Melbourne, Australia. Mr. Ulmer joined Goodrich in 1941 after studying industrial management at the University of Akron. After filling several supervisory positions, he became night superintendent of the Tire Division in 1950 and, in 1951, general foreman of the division.

Philadelphia Group Hears Pfeiffer on Silicone Progress

► The Philadelphia Rubber Group, at its meeting on January 23 at the Poor Richard Club, Philadelphia, Penna., unanimously accepted a proposal that the group sponsor an annual scholarship at the University of Akron, and heard a "Progress Report on New Silicone Rubbers" by William Pfeiffer of the Silicone Products Department, General Electric Co. Over 160 members attended the dinner-meeting.

H. C. Remsberg (Carlisle Tire), program chairman, introduced the guest speaker, William Pfeiffer (General Electric), who discussed the progress being made on new silicone rubbers by General Electric. Mr. Pfeiffer discussed the experiments and tests being made on various nitrile silicone rubber batches by the Silicone Products Department in order to develop a silicone rubber that will be oil and fuel resistant.

He explained that in order to accomplish this, it was necessary to go back to the basic polymer and replace the methyl group with a siloxane chain. He pointed out that all the tests tried to obtain the optimum of between 15 and 20 per cent swell.

The tests were conducted on numerous grades of oil and fuel in temperatures ranging from room temperature up to 450°F, for as much as 70 hours. Mr. Pfeiffer said that General Electric's silicone rubbers are presently in only pilot plant operation with full-scale production beginning later this year.

Scholarship Proposal

Dr. Morton Youker (DuPont), National Chairman, Rubber Division, ACS, presented the scholarship proposal which is designed to aid in the training of men for the rubber industry. The members unanimously passed the following proposition:

The Philadelphia Rubber Group offers an annual scholarship of $500 per year, tenable at the University of Akron, subject to the following restrictions: (1) The holder of the scholarship must be a full-time graduate student in the field of rubber and polymer chemistry; (2) He must have attended a high school, preparatory school or college in the states of Pennsylvania, New Jersey, Delaware or Maryland; (3) If no applicant has the qualifications set forth in paragraph 2, the scholarship may be awarded to some other qualified candidate, (4) The awarding of this scholarship shall be handled by the Scholarship Committee of the University of Akron, and the Philadelphia Rubber Group shall be notified of each choice prior to the award; and (5) This scholarship will be awarded annually unless withdrawn by written notice to the University of Akron prior to February 1 of the award year.

Survey Indicates Rubber Industry Keeps Pace With National Trends

► A nation-wide survey of 17 management consulting firms has revealed that wage incentive plans have increased productivity in 29 different industries by an average of 63.55 per cent. The survey also shows that employee earnings in the 29 industries increased by an average of 20.6 per cent, while the companies realized an average saving in unit labor costs of 25.91 per cent as a result of the incentive programs. The survey was conducted throughout 1958 by the George Elliott Co., Inc., 400 Park Ave., New York, N. Y.

The rubber industry, one of the 29 industries studied, shows a 64 per cent productivity increase; increased employee earnings of 26.50 per cent; and decreased unit costs of 31.50 per cent, just about the national average.

The tabulations represent 2500 wage incentive installations with every section of the U. S. represented. The survey indicated that 77 per cent of the wage incentive plans were installed since 1948, while 23 per cent began during the war and pre-war periods. The tabulations showed no difference in percentage insofar as the time period of installation was concerned.

Broken down further, the averages showed that for every 1 per cent increase in wages earned by the worker, the aggregate companies increased their productivity by 3.1 per cent and reduced their unit labor costs by 1.25 per cent. In order to avoid extreme values in the over-all average, the final results were weighed by eliminating the top 25 per cent and the bottom 25 per cent of the cases reported, using only the middle 50 per cent, or the inter-quartile range. Had the extremes been figured in, there would have been a big distortion in increased productivity, etc.

On the average basis, some 43 companies in each industry were sampled in the final tabulation, but this actually ranges from as few as seven companies which represent a small industry category having few companies, up to 85 industries which have many companies. In all cases the statistical sampling is sufficient to give reliable figures.

The complete breakdown between the 29 industries are listed below in the order of their increased productivity, with the tobacco industry average amounting to a 100 per cent increase down to a 39 per cent increase for the automobile and auto equipment industry. According to the Elliott company, industry variations are due to several factors, the most important being that some industries are simply more alert to cost reduction possibilities than others. Other reasons are that in some industries the manufacturing processes determine output more than in others.

INDUSTRY GROUP	% Increased Productivity	% Decreased Unit Costs	% Increased Employee Earnings
Tobacco Manufacture	100.00	49.00	9.00
Petroleum & Coal Products	96.50	26.50	24.00
Air Transportation-Common Carriers	95.00	37.00	17.00
Stone, Clay & Glass Products	93.44	37.89	31.22
Printing and Publishing	90.25	26.50	24.00
State & Local Government Enterprises	89.00	39.00	19.00
Paper Making and Converting	81.22	34.56	23.44
Meters, Measuring Instruments	81.22	33.44	29.00
Chemical & Allied Products	75.36	32.63	34.46
Metal Rolling & Extruding	74.00	39.00	25.67
Fabricated Metal Products	74.00	29.43	27.48
Electrical Mechanisms	71.63	31.11	25.84
Service Allied to Transportation	71.50	19.00	31.50
Primary Metal Products (Foundries)	71.00	33.00	29.50
Miscellaneous Small Items (Stampings)	70.82	35.36	26.27
Transport Equipment (except Autos)	70.43	31.86	31.71
Machinery Mfg. (except Electrical)	69.56	29.56	28.44
Rubber Products	**64.00**	**31.50**	**26.50**
Textile-Mill Products	60.81	28.09	26.27
Personal & Business Services	60.67	24.17	19.00
Leather & Leather Products	60.11	35.56	26.78
Wood Products (excluding Furniture)	57.00	23.00	25.00
Food & Kindred Products	55.47	29.59	17.82
Military Air Service	54.00	9.00	—
Railroads	49.00	59.00	39.00
Apparel & Other Finished Fabrics	47.33	25.67	20.00
Furniture	47.18	32.63	24.46
Lumber Mill Products	42.33	27.33	18.67
Automobiles & Auto Equipment	39.00	19.00	19.00

John Gifford, president of the Witco Chemical Co., addressed the Spanish Rubber Study Team at a luncheon meeting held at the Chemists' Club by the company.

Spanish Rubber Industry Study Team Visits U.S. Under ICA Sponsorship

► A Spanish Rubber Industry Study Team visited the United States under the auspices of the International Cooperation Administration, Washington, D. C., from January 9 to February 20, during which time the group observed modern methods of manufacturing in American plants. The study was initiated in order to improve manufacturing techniques and increase productivity in the Spanish rubber industry. Participants of the team were elected by the National Commission for Industrial Productivity of the Government of Spain.

Those elected to the study group were Goitia Francisco Letamendia, general manager of Caucho Especial, M. R. M. Sociedad Anma; Ollo Ricardo Battaler, lawyer and managing director for Curtidos y Tejidos Industriales, S. L.; Tomeo Tomas Blay, technical director for Blay Corbella, Tomas Diputacion St.; Plana Jose Diaz-Varela, assistant and production manager for Sociedad Espanola Procedimientos; Vilaclar Cesar Feliu, manager and technical director for VDA, De Cesar Feliu; Agustino J. Angel Fernandez, manager and technical manager for Fernandez Hermanos S. A., Rubber and Latex Foam Division.

Also included on the team were Amadios Francisco Gonzalez, attorney and technical chief for Manuel Rey E. Hijos, S. L.; Rius Enrique Guix, general manager for Guix, S. A.; Alberola Alfonso Rubio, technical manager for Plastex, S. A.; and Guarro Raimundo Sague, technical manager for Vilarrubis y Sague, S. A.

The study team was assisted by ICA officers A. E. Laurencelle, as project manager, and M. H. Prang, as consultant. Embassy representatives from the Commercial Office of the Spanish Embassy were Enrique Dominguez-Passier and Electo Garcia-Tejedor, both of whom served as economic attaches. Antonio Espinosa, of the Spanish General Consulate, was consulate representative, while Arturo Rumeu and Alberto de la Cruz served as interpreters.

The team's interests embraced plant layout, production planning, manufacturing methods, modern machinery, management organization and other aspects of the rubber industry. In addition, the participants wished to study sales techniques and their organization including advertising and other promotional work. Special attention was given to the subjects of quality control, research and development, industrial standards and management in general. On its return to Spain, the team planned to prepare a comprehensive report of its impressions and observations with recommendations for increased productivity. This report would be available to the entire Spanish rubber industry.

The group's program included plant tours, industry conferences, discussions, lectures and meetings with industry and government officials. The extensive tour began with a visit to the United Nations on Friday, January 9. On Monday, January 12, an industry orientation meeting was held by the Rubber Manufacturers Association, Inc., at the Sheraton McAlpin Hotel in New York City. Attending the meeting were Ross R. Ormsby, W. J. Sears, vice-president; and C. W. Holligan, treasurer. On the following day, a reception was held at the Chemists' Club in New York City by the Texas-U. S. Chemical Co.

Next on the agenda, the team visited Farrel-Birmingham Co., Inc., in Ansonia, Conn., where they were taken on an inspection tour, after which a mutual discussion period was held. On Thursday, January 15, officials of the Witco Chemical Co. held a luncheon meeting for the team at the Chemists'

During a tour of the Farrel-Birmingham Process Laboratory at Ansonia, Conn., the group stopped to examine and discuss an elaborately equipped extruding machine.

Club. During the meeting, John Gifford, technical director of the company, discussed quality and quality controls of carbon black in the rubber industry. A plant tour and discussion period was next held at the American Cyanamid Co., Bound Brook, N. J., on January 16.

A full program of lectures was conducted by the Elastomer Chemicals Department of E. I. du Pont de Nemours & Co., Inc., in Wilmington, Del., on January 19. Papers delivered were "History of DuPont Products and Management"; "Status of DuPont Elastomers in Wire and Cable"; "DuPont Elastomers, Sales Promotion and Advertising"; and "The Elastomer Chemicals Department Overseas". Afterwards, the group visited the Elastomers Laboratory, where they heard a paper on "Engineering Aspects of the Laboratory", and later, a laboratory tour was conducted.

Industrial relations were discussed on Wednesday, January 21, at a meeting with officials of the International Cooperation Administration in Washington, D. C. The following day, the team visited the U. S. Department of Labor, Office of International Labor Affairs. Topics discussed at this meeting were "Economic Conditions of Workers in the U. S." and "Labor Management Relations Laws and Their Administration". On Friday, January 23, the group visited the American Council on Education.

Tour Copolymer Plant

A visit to Texas-U. S. Chemical Co. in Port Neches, Texas, was scheduled for Monday, January 26. There, at a reception, in the manager's office, a discussion was held on the orientation of the plant and its facilities, including butadiene production. There was also a tour of the plant and later a tour of the copolymer plant. The group visited the Phillips Petroleum Co. in Borger, Texas, on Wednesday, January 28. They toured various company facilities including the philblack carbon black plant; the carbon black pilot plant; the philprene synthetic rubber plant and the butadiene plant. From there, they went to the Phillips plant in Bartlesville, Okla., where they met with company management and with research and development personnel.

Tours and discussions were also held at the American Synthetic Rubber Corp., Louisville, Ky.; McNeil Machine & Engineering Co., Akron, Ohio; Midwest Rubber Reclaiming Co., Barberton, Ohio; the research facilities at Avon Lake, Ohio, of the B. F. Goodrich Co.; Firestone International Co., Akron, Ohio; Faultless Rubber Co., Ashland, Ohio; Hewitt-Robins, Inc., Buffalo, New York; Hood Rubber Co., Boston, Mass.; and the Research and Development Department of Godfrey L. Cabot, Inc., Cambridge, Mass.

Directory Available

► The U. S. Department of Commerce, Washington, D. C., is publishing a periodical planned to serve as a central source of information in the U. S. on Russian and other technical translations available to science and industry. The periodical, *Technical Translations,* is being published twice a month by the Office of Technical Services, in cooperation with the Special Libraries Association. It lists abstract translated material available from U. S. Government sources, SLA, cooperating foreign governments, educational institutions and private sources. The Special Libraries Association's periodical, *Translation Monthly,* is being incorporated in *Technical Translations.*

Technical Translations is being sold by the Office of Technical Services at $12 a year ($4 additional for foreign mailing). Single copy is 60c. Orders should be addressed to Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C.

RMA Opposes Tax

► Ross R. Ormsby, president of the Rubber Manufacturers Association, on behalf of the Tire Division, has registered opposition to any of the tax increases that have been proposed to finance the expanded Federal highway construction program. Mr. Ormsby stated, "There is increasing evidence that the administration may ask for an increase in Federal highway user taxes." He pointed out that the tire manufacturers had supported the Highway Act of 1956, even to the extent of backing a 60 per cent increase in the Federal excise tax for highway type tires deemed necessary to the successful financing of the program.

"Under the Highway Trust Fund in the 1956 Act," he stated "highway users are now paying the total costs of the Federal highway program despite the fact that the program contributes to the country's defense and permits improved postal service, to mention only two of its general welfare aspects.

"These same highway users also pay into the general fund additional general and special taxes. The Tire Division strongly favors an appropriation from the general fund to provide the additional current revenue required for the completion of the Interstate and Defense Highway System, and to support the other Federal-aid highway programs."

Diamond Alkali Appoints Eight

► Diamond Alkali Co., Cleveland, Ohio, has announced eight new appointments to its Plastics Division sales and service organizations. Harry E. Connors was named product manager of Diamond paste resins. He was formerly manager of packaging products for the Finishes Division of Interchemical Corp. Charles E. Henry was appointed sales representative for Diamond PVC resins in Ohio, Kentucky, western Indiana and western Pennsylvania. He was formerly associated with Tennessee Products & Chemical Corp., in a sales development capacity. Herbert C. Jardine was named sales representative to cover the southeastern states for Diamond's Plastics Division. He was formerly connected with Watson-Standard Co. in a technical sales and service capacity on plastisols.

Phillip I. Johnson was assigned to cover the New York-Baltimore area as PVC resin sales promotion representative. He went to his new post with Diamond from W. R. Grace & Co. Alexander A. Jigger, a member of Diamond's New York-New England branch office sales staff since 1948, will now concentrate his attention on Diamond PVC resins as a sales representative. His territory will cover the New England States. Raymond A. Chartier and Peter S. Weill have been named technical service representatives on calendering and paste resins respectively. Both men were formerly associated with Naugatuck Chemical Division of U. S. Rubber Co. James N. Jenkins, a Diamond technical service representative for the past six years, will now handle customer service problems involving extrusion of PVC resins. He joined Diamond as a chemist in 1942.

Stein Hall Appointments

► Stein, Hall & Co., Inc., New York, N. Y., has announced the appointment of Paul Kaplan as technical director, Albert R. Robbins as manager of the Development Department and Arthur M. Goldstein as director of the firm's New York laboratories. Mr. Kaplan will be in charge of the company's laboratories and Development Department in New York; the textile laboratories in Charlotte, N. C. and Pawtucket, R. I., and the plant laboratory in Charlotte. He holds a B.S. degree in chemical engineering from Rose Polytechnic Institute, and has been with the company since 1946.

Mr. Robbins started with Stein, Hall in 1951. He has a B.S. degree in chemistry from Rutgers University, and an M.S. degree in chemical engineering from New York University. Mr. Goldstein started with Stein, Hall in 1947. He is a graduate of City College of New York and has a M.S. degree in agricultural chemistry from Ohio State University.

Names in the News

Hugh Burdette and **E. L. Green, Jr.** have been elected to the board of directors of Godfrey L. Cabot, Inc. Mr. Burdette currently holds vice-presidential posts with several company subsidiaries and also serves as general manager of Cabot's Southwestern Division. Mr. Green is vice-president of both Cabot Carbon Co. and Cabot Gasoline Corp., and general manager of the company's Oil, Gas and Gasoline Department.

Leverett A. Anderson, owner of a firm selling raw and semi-finished materials to Ohio rubber and plastics industries, has been named president of the Akron Kiwanis Club for 1959.

John J. Singleton, president of the Cascade Rubber Co., has been honored by the National and Ohio American Legion and Ohio State Employment Service for his work in hiring handicapped veterans.

J. T. (Tom) Callaway, assistant to the vice-president of manufacturers sales for the Goodyear Tire and Rubber Co., has been honored for his 40 years of distinguished service to the firm and has received the 40-year pin.

J. E. Broadbent, who has spent eight years as territory representative for rubber manufacturers, has been appointed assistant sales manager of the Mohawk Rubber Co.

Mortimer H. Nickerson, formerly chief chemist for DeBell and Richardson, Inc., has joined Arthur D. Little, Inc., as a staff associate in the Research and Development Division.

Norman A. Pierce, who was previously on the controller's staff, where he handled special assignments for the B. F. Goodrich Co., has been named manager of corporate accounting for the company.

Frank R. Rebek, previously truck tire sales manager in Chicago for the General Tire & Rubber Co., has been promoted to Detroit Division manager, succeeding **Don E. Casterline,** who has been transferred to the company's Dallas Division as manager.

Louis K. Eilers, formerly vice-president and assistant general manager of the Eastman Kodak Co., has been named first vice-president of the Tennessee Eastman Co. and the Texas Eastman Co. and president of Eastman Chemical Products, Inc., succeeding **William S. Vaughn,** who has been elected vice-president and general manager of the Eastman Kodak Co.

R. G. David, account executive for the Manufacturers Sales Department of the Goodyear Tire & Rubber Co., has been presented with a 40-year emblem to honor his fortieth year of service to the firm.

Harry D. McNeeley, vice-president of the Tennessee Eastman Co., has been promoted to executive vice-president of the firm.

Jack B. Scarcliff, formerly manager of sales promotion for the Firestone Tire & Rubber Co., has been named manager of retail advertising for the firm, succeeding **A. E. Brubaker,** who has been promoted to director of public relations.

Henry M. Morgan, assistant director of the Fabric Research Laboratories, has been named to the Committee on Personnel Armor for the National Academy of Sciences — National Research Council—Advisory Board on Quartermaster Research and Development.

Charles H. Sturgeon, formerly traffic manager of the Square D Co., has been named general traffic manager for the B. F. Goodrich Co., succeeding **Kermit R. Sadler,** who has retired.

Harold P. Brown, of the B. F. Goodrich Co., and **H. A. Pace,** of the Goodyear Tire & Rubber Co. research staff, have been elected chairman and chairman-elect, respectively, of the Akron Section of the American Chemical Society.

A. Nourry and **W. Murray** have been appointed joint managing directors for the Northwestern Rubber Co., Ltd., Liverpool, England.

Oliver C. Nusslock, previously associated with N. L. Kuehn Co. as vice-president, sales, has been appointed district manager for Wisconsin for the Industrial Products Division of the Cooper Tire & Rubber Co.

George M. Brush, formerly a sales engineer stationed in Detroit for Firestone Tire & Rubber Co., has been appointed manager of automotive tire engineering in Detroit for the firm.

Fred A. Weymouth, previously vice-president of the Printing Ink Division for the Interchemical Corp., has been named a vice-president of the company.

Thomas V. Horrigan, assistant treasurer of the U. S. Rubber Co., has been elected to membership in the Controllers Institute of America.

E. J. Thomas, chairman of the board for the Goodyear Tire & Rubber Co., was one of the seven business leaders elected to membership on the board of trustees of the Committee for Economic Development in New York City.

Arthur H. Phillips, general counsel and secretary for Godfrey L. Cabot, Inc., has also been appointed clerk for the firm.

James E. Spencer of the Harshaw Chemical Co., has been nominated president of the Salesmen's Association of the American Chemical Industry, Inc.

Philip M. Dinkins, previously vice-president and general manager of the Dyestuff & Chemical Division for General Aniline and Film Corp., has been elected president of the firm, succeeding **John Hilldring,** who has been elected chairman of the board.

E. Duer Reeves, who has served as executive vice-president for the Esso Research and Engineering Co. since 1949, has been elected executive vice-president of the firm and director and vice-chairman of the executive committee of the Esso board.

Andrew E. Sirasky, formerly personnel manager and merchandising manager at the Sun Rubber Co., has been named sales service manager for the Rempel Manufacturing Co.

Dr. Carl E. Barnes has been named vice-president, research, for the Minnesota Mining & Manufacturing Co., while **Dr. John W. Copenhaver** has been appointed director of central research for that firm.

E. Laurence Gay, formerly associated with the law firm of Debevoise, Plimpton & McLean, specializing in corporation finance work, has been elected secretary-treasurer for Hewitt-Robins, Inc.

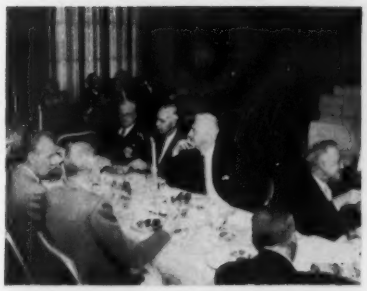
Harlan E. Eastman, previously purchasing agent for the Helipot Division of Beckman Instruments, Inc., has been appointed to the newly created post of purchasing administrator for the firm.

Harold Hedden, sales representative for the New Jersey Zinc Co., has retired after more than 48 years of service with that organization.

Dr. John R. Nazy and **Ronald A. Thursack** have joined the Development Department of Union Carbide Chemicals Co. at South Charleston, West Va.

Robert L. Richmond, formerly manager of federal tax accounting for the B. F. Goodrich Co., has been named general auditor, succeeding **Roy C. Taylor,** who has retired from the firm.

Thiokol Honors Pioneers in Synthetic Rubber



► A dinner honoring America's pioneers in synthetic rubber was held at the Princeton Inn, Princeton, N. J., on January 9 under the sponsorship of the Thiokol Chemical Corp. Most of the 60-odd invitees were in appearance and the evening was devoted to anecdotes and reminiscences of the advent of the commercial synthetic rubbers in the United States from the introduction of polysulfide and chloroprene rubbers in the early 1930's to the development of the butadiene-styrene rubbers during World War II. The evening was marked by informality and no speeches were permitted. Serving as hosts were Joseph Crosby, S. M. Martin, Jr., and Harry Ferguson of the Thiokol organization. A brief history of synthetic rubber in America, prepared by Peter P. Pinto, formerly general manager of RUBBER AGE, appeared in the souvenir menu distributed at the dinner. The photographs above show participants in the affair during various stages of the celebration.

Edward E. Zeilstra

Zeilstra Named By Rhee Elastic

► Edward E. Zeilstra has been appointed technical superintendent of Rhee Elastic Thread Corp., Warren, R. I. He will be administrator of all manufacturing, engineering and laboratory facilities, and will be coordinator of customer service. Mr. Zeilstra, since graduating from Calvin College in 1934, has been associated with the rubber industry, starting in the laboratories of the Ford Motor Co., Dearborn, Mich. From 1943 to 1946, he was chief chemist and development engineer at John Roeblings' Sons Co. In 1947 he was chief chemist at Carr Mfg. Corp., and for the past six years he has been associated with Lloyd Mfg. Co. as technical director. Mr. Zeilstra is a member of the American Chemical Society and the Rhode Island, New York and Boston Rubber Groups.

JaRo Chem Named Representative

► JaRo Chem, Dallas, Texas, has been appointed sales representative for the Colton Chemical Co., a Division of the Air Reduction Co., Inc., Cleveland, Ohio. JaRo Chem, which also has offices in Houston, Texas, is owned and operated by James Robbs and Al Crosby. The firm will serve primarily the Texas area from new sales offices and warehouses just completed. The warehouse contains bulk storage facilities for Colton's polyvinyl acetate emulsions.

Carpenter Named General Manager

► Copolymer Rubber & Chemical Corp., Baton Rouge, La., has named Dr. Paul G. Carpenter as acting general manager of the corporation, who will assume the administrative and operations direction of the plant. Dr. Carpenter is a graduate of the University of Wisconsin. He joined Copolymer in 1956, as director of research and development. Prior to joining the company, he was employed by Phillips Petroleum Co.

Four Firestone Staff Changes

► Firestone Steel Products Co., Akron, Ohio, has announced that Walter S. Kidder, formerly manager of rim sales, has been named general sales manager, while W. H. Vaughn, formerly manager of Firestone's plant in Wyandotte, Mich., has been appointed Detroit (Mich.) sales manager. C. C. Cupp moves from his position as sales representative in Detroit to manager of rim and wheel sales, with headquarters in Akron. James B. Call, former production manager of the Akron steel products plant, has been appointed administrative assistant to Mr. Kidder.

Mr. Kidder joined Firestone's college training class in 1925 and during his first five years with the company, held several sales positions. In 1930, he was transferred to the Steel Products Co. and had advanced to manager of rim sales by 1950. Mr. Vaughn started with Firestone in 1929 and worked in the Akron steel products plant until 1938, when he was transferred to Wyandotte, Mich., as chief inspector. He was assigned to the Fall River, Mass., plant in 1940 and three years later, he returned to Wyandotte as plant manager. Mr. Cupp has been with Firestone for 32 years, starting in its college training class in 1926. Afterwards he held sales positions in Portland, Maine; Boston; Chicago; and Omaha, Nebr. Early in 1942, he was placed in charge of Firestone's government sales and in 1944 he was named Detroit sales representative. Mr. Call joined Firestone in 1947 as a time study trainee and in 1950, was promoted to the position of industrial engineer. In 1954, he was made assistant production manager and he became production manager a year later.

RUBBER RED BOOK

► Palmerton Publishing Co., New York, N. Y., publishers of RUBBER AGE and ADHESIVES AGE, have announced a new publication policy for the RUBBER RED BOOK, the directory of the rubber industry. Previously issued on a biennial basis, the RUBBER RED BOOK, beginning with the 1959 edition, will be published annually. The publication of the 1959 edition has been set for June of this year. In addition, a new size and format have been adopted for the directory. Formerly available as a hard bound book measuring 6¼ by 9¼ inches, the directory will now be published as a soft bound volume measuring 8¼ by 11¼ inches. Palmerton Publishing officials point out that by issuing the directory on an annual basis listing can be kept completely up-to-date. The new size will permit greater flexibility between text and advertising material

Thomas B. Nantz

Goodrich Promotes Nantz

► B. F. Goodrich Chemical Co., Cleveland Ohio, has announced the promotion of Thomas B. Nantz to vice-president of manufacturing, succeeding Robert D. Scott, recently made vice-president of development. Formerly general manager of plants, Mr. Nantz joined Goodrich as a chemist in 1937 after graduating from the University of Kentucky. In 1940 he became a foreman and technical man at one of the firm's Akron plants. In 1955, he was appointed general manager of plants. Mr. Nantz is a member of the American Institute of Chemical Engineers and the American Chemical Society.

Rubber Compounding Lectures

► The Akron Rubber Group and the Evening Division of the Department of Chemistry at the University of Akron, have announced a series of 15 advanced rubber compounding lectures, held on Monday evenings at 8:30 p.m. in Knight Hall, Akron, Ohio. The lectures began on January 12, 1959, and will terminate on April 27. The series fee is $15, and the series is specifically designed for rubber compounders. The 15 lectures are "Introduction to Lecture Series" and "Chemistry & Physics of Polymers, Part I"; "Chemistry & Physics of Polymers, Part II"; "Carbon Blacks—Their Application in Rubber"; "Non-Black Pigments — Application in Rubber"; "Curing Systems"; "Antioxidants, Antiozonants and Waxes"; "Rubber Manufacturing Equipment"; "Factory Processing"; "Compounding to Service Specification (Including Costs)"; "Practical Problems — Metal Adhesives and Cements"; "Practical Problems—Sponge Products"; "Practical Problems—Tires and Related Products"; "Practical Problems—Hose and Belting"; "Practical Problems—General Molded and Extruded Products". A plant trip to Rubbermaid, Inc., has also been scheduled.

J. C. Roberts

Promoted By Firestone

► J. C. Roberts has been named president of the Firestone Synthetic Rubber and Latex Co., Akron, Ohio, succeeding Alvin D. Miller, who died recently. He will also continue in his present capacity as director of rubber purchases for Firestone Tire and Rubber Co., the parent firm. Mr. Roberts was graduated from Ohio Wesleyan University in 1923 with a B.S. degree, after which he attended the Harvard Graduate School of Business Administration. He became a member of Firestone's college training class in 1924 and began his career with the company as a member of its Auditing Department. Afterwards, he was assigned to Singapore as a rubber buyer. He became an economist for the company in 1930 and was named director of purchases in 1940.

In 1940, Mr. Roberts also joined a small group in private industry which gave its services to the government through the Reconstruction Finance Corp. During World War II, he was loaned by Firestone to the RFC. He became a member of the Rubber Reserve Co. and was one of the group which negotiated treaties with South American countries to promote the production of natural rubber in the Amazon river region. He is a member of the Rubber Advisory Committee of the General Services Administration and has served as a delegate of the United States Department of State to International Rubber Study Group Conferences since the group was formed in 1945. Mr. Roberts also serves as a member of the Rubber Advisory Panel of the State Department, the Crude Rubber Committee of the Rubber Manufacturers Association and the Raw Materials Committee of the United States. Council of the International Chamber of Commerce.

► A new catalog sheet which describes features of the No. 5235 electric-powered buffing tool, has been published by the Dill Manufacturing Co., Cleveland, Ohio.

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CHARLOTTE, N.C. — W. S. Anderson, Carolina Specialty Co.
ATLANTA, GA. — J. R. Angel, Mortgage Guarantee Building
TORONTO 1, CAN. — Hugh Williams & Co., 27 Wellington St. East

William C. Franklin

Promoted By TB&CC

► William C. Franklin, who has been associated with the Texas Butadiene & Chemical Corp., Houston, Texas, in a sales capacity since 1957, has been promoted to assistant sales manager. Previously, Mr. Franklin had been with C. F. Braun & Co. and before that, he spent eight years in the Petrochemicals Production Department of Union Carbide Chemicals Co., Texas City, Texas. Mr. Franklin is a graduate of Texas A & M College with a degree in chemical engineering.

Dow Buys Catalin Lines

► Dow Chemical Co., Midland, Mich., has invested $2,300,000 in Catalin Corp. of America, New York, N. Y., by purchasing a subordinated convertible note of Catalin, according to a joint statement made by the two firms. Proceeds of the loan will go into the general funds of Catalin with a large portion earmarked for expansion purposes. The company also intends to call in its outstanding preferred stock and is setting aside approximately $850,000 for this purpose. According to the terms of the loan, amortization payments will begin on April 1, 1971. The loan, which is subordinate to existing indebtedness, is convertible at the lender's option to Catalin common stock at $8.50 per share.

Lambert Named Sales Manager

► Howard K. Lambert has been named general sales manager of the Machine Division for the Hobbs Manufacturing Co., Worcester, Mass. Succeeding Mr. Hobbs to the post of district sales manager at Cleveland, Ohio, is Larry Damour, previously plant sales engineer at the company's headquarters in Worcester. Mr. Lambert has been associated with Hobbs since his graduation from the University of Maine in 1950 with a B.S. degree in mechanical engineering. He served the company as district sales manager of the New England area and the Cleveland office.

Financial News

A. G. Spalding

► Year to October 31: Consolidated net earnings of $801,092, which is equal to $1.21 a share, compared with $493,742, or 74c a share, in the preceding fiscal year. Sales in fiscal 1958 totaled $42,435,161, compared with $42,419,232 the year before.

Rubbermaid

► Year to September 30: Net income of $1,135,037, which is equal to 92c per common share, compared with $1,061,306, or 90c, in the preceding fiscal year. Sales last year totaled $21,474,805, compared with $21,100,472 in fiscal 1957.

Hooker Chemical

► Year ended November 30: Net income of $10,639,438, which is equal to $1.43 per common share, compared with $11,184,197, for $1.50 a share, in the preceding fiscal year. Sales in fiscal 1958 totaled $125,545,515, compared with $128,422,221, in fiscal year 1957.

Midwest Rubber Reclaiming

► Year to October 31: Net income of $724,347, which is equal to $2.39 per common share, compared with $187,963, or $2.71 a share, in fiscal 1957. Sales in the year to October 31 totaled $9,428,669, compared with $9,907,569, in the preceding fiscal year.

Lee Rubber

► Year ended October 31: Net earnings of $1,797,919, which is equal to $2.12 per share, compared with $1,762,581, or $2.09, in the preceding fiscal year. Sales last year totaled $46,558,852, compared with $48,601,093, the year before.

Barry Controls

► Nine months to September 30: Net income of $202,815, equal to 72c per share of common stock, compared with $143,935, equal to 48c per share, for the same period of 1957.

New Jersey Zinc

► Nine months to September 30: Net income of $107,655, which is equal to 5c per common share, compared with $1,540,566, or 79c per share, in the 1957 nine month period.

St. Joseph Lead

► Nine months to September 30: Net income of $2,619,416, which is equal to 96c a share, compared with $7,169,620, or $2.64 a share, in the same period of 1957.

William E. Thomas

Promoted By United Engineering

► United Engineering and Foundry Co., Pittsburgh, Penna., has announced the promotion of William E. Thomas, formerly manufacturing assistant, to assistant to the vice-president of operations. Mr. Thomas started with the company at its Youngstown, Ohio, plant in 1940. There, he advanced to assistant machine shop superintendent and in 1955, he was transferred to the Pittsburgh office as manufacturing assistant.

Wolfe Retires From Goodyear

► William S. Wolfe, consultant to Sam DuPree, Goodyear vice-president in charge of production, has retired from Goodyear Tire & Rubber Co., Akron, Ohio, after 35 years with the company. Mr. Wolfe was graduated from Marietta College in 1910 with a B.A. degree in chemical engineering and in 1912 from the Massachusetts Institute of Technology. He then joined Goodyear as a member of the Development Department and became chief development engineer in 1915. In 1922, he left Goodyear to become vice-president and factory manager of Seiberling Rubber Co., but returned to Goodyear 12 years later. He spent three years in the Sales Department, working primarily on truck tires and rejoined the factory organization in 1937 as manager of development. Mr. Wolfe was named director of domestic production in 1957.

Carlisle Purchases Tensolite

► Carlisle Corp., Carlisle, Penna., has announced that it has purchased Tensolite Insulated Wire Co., Inc., Tarrytown, N. Y., for an undisclosed amount of money. Carlisle produces a number of rubber products including bicycle tires, inner tubes and brake linings. To its present line, Carlisle now adds Tensolite's plastic coated wire line. According to the company, Tensolite has annual sales of about $5 million. Carlisle, in 1958, had sales of between $14 million and $15 million.

ACS Names Officers

► Dr. John C. Bailar, Jr., professor of inorganic chemistry at the University of Illinois, has been named president of the American Chemical Society for 1959, succeeding Dr. Clifford F. Rassweiler, vice-president of research and development for Johns-Manville Corp., New York, N. Y. ACS has also announced that Dr. Albert L. Elder, director of research for the Corn Products Co., Argo, Ill., has been named president elect of the society, in a nation wide ballot, and will take office in 1960.

Dr. William J. Sparks, co-developer of butyl rubber and scientific advisor for the Esso Research and Engineering Co., Linden, N. J., has been elected a director-at-large. To serve a four year term on the board of directors, Dr. Sparks succeeds Dr. Charles L. Thomas, director of research and development for the Sun Oil Co., Marcus Hook, Penna. Dr. Byron Reigel, director of chemical research and development for G. D. Searle & Co., Chicago, Ill., has also been elected to the society's board of directors and will serve for a three year term as a regional director. Dr. Louis P. Hammett, professor of chemistry at Columbia University has been re-elected a regional director.

Appleton Appoints Executives

► Appleton Machine Co., Appleton, Wisc., has announced the appointment of Tany Agronin as president, succeeding Victor W. Bloomer who has been named chairman of the board. The company has also named John MacDonald, Jr. vice-president. Mr. Agronin, previously executive vice-president and general manager, joined the firm in 1957 after serving as manager of Black-Clawson's Brazilian affiliate, Companhia Federal de Fundicao. He received his masters degree in engineering from Syracuse University and is a member of the Pulp and Paper Superintendents Association, TAPPI and ASME. Mr. Bloomer, who began with Appleton in 1920, has served as its president since 1949. Mr. MacDonald was employed by Minnesota Mining and Manufacturing Co. before joining Appleton. He was eastern sales engineer for Appleton for four years until his promotion to manager of market development in 1957. He is a graduate of New York Military Academy and attended the University of Miami.

Rehm Named Plant Manager

► Robert E. Rehm has been appointed manager for the Respro Division plant, Cranston, R. I., of the General Tire & Rubber Co. Mr. Rehm joined the company in 1949 and later became production manager of the Akron tire plant. He is a native of Akron and a graduate of the University of Akron with a degree in mechanical engineering.

United Carbon Begins Construction Of Technical Service Laboratory

► United Carbon Co., Charleston, West Va., has begun construction of a sales technical service laboratory in Akron, Ohio. According to the company, the purpose of the new laboratory is to assist the rubber industry and allied manufacturers directly in making the most effective use of United's products. Frank C. Holmes, Jr., United Carbon manager of sales development, will direct the laboratory's activities upon its completion late this summer.

The new building will have complete facilities for an initial staff of approximately 20 scientists, engineers and technicians. The modern masonry and steel building will have nearly 11,000 square feet of working space. The building includes five offices, six laboratories and a library on the first floor. The laboratory space has provisions for rubber mixing, compounding and milling and a press room. The building's basement provides room for additional offices and laboratory space, a conference and lunch room, test rooms and essential power service facilities.

Mr. Holmes has had 25 years experience in production phases of the rubber industry, gathered in a variety of technical and executive posts. During the past three years, he served as factory manager for the W. J. Voit Rubber Corp., in Los Angeles, and earlier was technical director for the Armstrong Tire & Rubber Co., at Natchez, Miss. Mr. Holmes attended Worcester Polytechnic Institute, Akron University and the University of Cincinnati. He is a member of the Akron Rubber Group and the Los Angeles Rubber Group.

Retired Executive Honored

► John J. Blandin, retired vice-president of rubber plantations and manager of the Crude Rubber Division of Goodyear Tire & Rubber Co., Akron, Ohio, has been honored at a dinner meeting by the Akron-Canton Chapter of the Naval Academy Alumni Association. The occasion marks the 50th year since Mr. Blandin left the U. S. Naval Academy at Annapolis. He spent two years at Annapolis before he was forced to leave because of an eye defect. He was with Goodyear for 45 years, retiring in 1957.

Columbian Appoints Agent

► Columbian Carbon Co., New York, N. Y., has appointed the B. E. Dougherty Co., which has offices in Los Angeles and San Francisco, Calif., as its West Coast representative. To handle Columbian's complete line of carbon black, iron oxides, lamp blacks, dispersions and plasticizers, the Dougherty staff of six technical sales representatives will cover California, Washington and Oregon.

Year-Round All-Purpose Tire

► Seiberling Rubber Co., Akron, Ohio, is producing an all-purpose tire for year-round service on small trucks and school buses. The company has added to its commercial line the "Commuter Truck and Bus Tire," a companion to the firm's Commuter Mud and Snow Passenger tire. Using the structural features of the smaller winter tire, Seiberling engineers developed the Commuter Truck and Bus Tire for larger vehicles which face traction hazards in any season. Seiberling reports that vehicles such as farm trucks, local delivery trucks, and light dump trucks, besides school buses, would get maximum use from the new product. The Truck and Bus tire is a combination of husky, slotted ribs and deep shoulder lugs on a wide, flat tread. The company claims that the tread design is shaped for self-cleaning to prevent packing of mud and snow between the shoulder lugs, enabling the tire to keep top traction efficiency at all time. The Commuter Truck and Bus Tire is available in three sizes: 7.50-20; 8.25-20; and 9.00-20.

T. F. Cooke

Promoted By American Cyanamid

► Dr. T. P. Cooke has been appointed commercial development manager for the Organic Chemicals Division of the American Cyanamid Co., New York, N. Y. In this capacity, Dr. Cooke will be responsible for coordinating technical service, market research and market development functions of the rubber chemical, cyanamid dye, textile chemical, explosives and mining chemical, intermediate and petrochemical products.

Dr. Cooke is a graduate of the University of Massachusetts and of Yale University, from which he received his Ph. D. degree in physical chemistry. He joined Cyanamid in 1940 as a research chemist and since 1945, he has served the company in numerous research and technical service managerial positions. His career at Cyanamid was interrupted during World War II, when he served as an officer with the U. S. Army Corps of Engineers.

Dr. Cooke is a Fellow of the American Institute of Chemists, and a member of the American Chemical Society and of the American Association of Textile Chemists and Colorists. He holds twenty patents and has numerous publications in the fields of textile chemicals, dyes and pigments.

Buffalo Group Elects Officers

► The Buffalo Rubber Group elected 1959 officers at its Annual Christmas Party held at the Buffalo Trap and Field Club on December 9, 1958. Approximately 250 members and guests were in attendance, and the party was highlighted with entertainment and the distribution of Christmas gifts to all in attendance. The 1959 officers are: *Chairman*, Richard J. Herdlein (Hewitt-Robins); *Vice-Chairman*, Lawrence J. Halpin (Dunlop Tire & Rubber); and *Secretary-Treasurer*, Edward Sverdrup (U. S. Rubber Reclaiming). New members elected to three year terms on the executive board were Robert Hirschbeck (Pierce & Stevens Chemical) and James Lorenz (Union Carbide).

American Cyanamid Appoints Three

► American Cyanamid Co., New York, N. Y. has announced the appointment of Dr. J. H. Paden as director of research for the Organic Chemicals Division. The company also has named E. K. Hunt to the newly-created post of merchandising manager, and H. C. Milton to succeed him as sales manager of the Plastics and Resins Division. Dr. Paden received his B.S. degree from the University of Illinois, his M.S. degree from the University of Minnesota and his doctorate from the University of Wisconsin. He joined Cyanamid in 1937 as a research chemist. In 1950, he was named director of the Research Department of the Stamford Laboratories, serving in this capacity until 1954 when he became director of the Bound Brook Laboratories. Dr. Paden is a member of the American Chemical Society.

Mr. Hunt, prior to being named manager of the Plastics and Resins Division in 1956, was public relations manager of Cyanamid. During his 15 years with the company, he also has served as advertising manager of the former Calco Chemicals Division, and advertising manager of both the Organic Chemicals and Pigments Divisions. He is a member of the National Industrial Advertisers Association and the Advertising Club of New York. Mr. Milton has been with Cyanamid for more than 20 years and has recently served as manager of the Process Chemicals Department, Industrial Chemicals Division. He also served as manager of the Manufacturers Chemicals Department.

Technical Papers Wanted

► The Division of Rubber Chemistry of the Chemical Institute of Canada would like to obtain original technical papers concerned with aging and weathering of elastomers, to be used in a symposium in conjunction with their 1959 annual convention at the Sheraton-Brock Hotel, Niagara Falls, Ontario, Canada, on May 1, 1959.

The symposium should offer considerable scope for discussion on any aspect referring to heat, oxygen, ozone and weather degradation of elastomers over a wide range of service conditions.

Firms interested in participating, with technical papers running approximately 30 minutes, should contact: Mr. J. A. Carr, Chairman, Division of Rubber Chemistry, C.I.C., c/o Dunlop Research Centre, 870 Queens Street East, Toronto 8, Ontario, Canada.

Edward G. Ronsick

Joins Goodyear Chemical Staff

► Chemical Division of the Goodyear Tire & Rubber Co., Akron, Ohio, has appointed Edward G. Ronsick to its Akron sales staff. Mr. Ronsick joined Goodyear in 1957 following graduation from the University of Missouri with a degree in chemistry. He worked in various capacities in the company's training squadron until he was permanently assigned to the Chemical Division. Mr. Ronsick also served as an Army second lieutenant in the field artillery at Fort Sill, Okla.

Trainer Gives Keynote Address

► James E. Trainer, executive vice-president for the Firestone Tire & Rubber Co., Akron, Ohio, gave the keynote address on January 15, before 200 high ranking officers attending a course on "Material Management" at the Industrial College of the Armed Forces, Fort McNair. His talk, entitled "The American Industrial Complex," considered the extent, complexities and interrelationships of American industry. The major part of the talk was devoted to the manufacturing phase of the country's industrial life, and its seven basic components: money, machines, material, management, markets, methods, and men.

Mr. Trainer's address opened the second half of the course. The Industrial College of the Armed Forces is a joint institution on the highest level in the educational system of the Department of Defense and operates under the direction of the Joint Chiefs of Staff.

United Carbon Acquires Stock

► United Carbon Co., Charleston, West Va., has acquired all the capital stock of the Argus Petroleum Corp. for an undisclosed sum of cash. A majority of Argus stock has been owned by Husky Oil Co. Acquisition of Argus gives United Carbon 727,000 acres of prospective oil land in the Peten Province of northern Guatemala.

Color Center Established

► Interchemical Corp., New York, N. Y., has established a central headquarters for basic research, consultation and information in the field of color at the company's Central Research Laboratories at 432 West 45th St., New York, N. Y. The new color center will serve not only the Interchemical operating divisions, but those indirectly allied to their field of interest. Liaison with scientific societies, industry associations and other groups concerned with the use of color will also be maintained. Basic research will be conducted on improved techniques for color matching and improved methods for establishing color standards and tolerances.

In addition, Interchemical's divisions and their customers will be able to consult the center on basic color theory and its many industrial applications. Similar color information and assistance will be available to advertising agencies, industry associations and other groups interested in the field of color. Among the special features of the center is a unique lighting system that can produce many of the kinds of illumination used in the appraisal of color. Its use with the center's precise colorimetric instruments will both facilitate research and help visitors understand some of the basic principles involved in the science of color.

MCC-100 Latex Formulation

► The Research Laboratories of Manufacturers Chemical Co., Philadelphia, Penna., have developed a new, commercially available latex formulation, designated "MCC-100". The company states that the new formulation exhibits the highest resistance to gas-fading of any commercially available latex backing material; has outstanding resistance to light degradation and oxidation; and shows negligible discoloration by copper-containing dyes. Its excellent film forming characteristics permit its use on loosely woven fabrics, carpets and other textiles. MCC-100 is also said to be economical, as four or five ounces per linear yard produce a tough backing which gives dimensional stability and body to the fabric.

Grace Gives Plastics License

► W. R. Grace & Co., New York, N. Y., has announced the completion of an agreement between the company's Polymer Chemicals Division and Columbus Plastics Products, Inc., Columbus, Ohio, which makes it possible for plastic resin suppliers to obtain sublicenses for the valve gating method of plastic injection molding. Such sublicenses permit resin suppliers to offer the process to molding customers on a licensee basis.

Oakite Marks 50th Anniversary Of Industrial Cleaning Service

Oakite Products, Inc., 19 Rector St., New York, N. Y., recently celebrated its 50th anniversary as developers of specialized industrial cleaning materials and methods for all industries. Oakite products have been widely used by the rubber industry for cleaning iron, steel and aluminum molds; storage protection for ferrous metal molds; pre-bond conditioning; cleaning Banbury mixers; scale removal; and preparing sheet rubber for storage and shipping.

The company has progressed in its 50 years from one cleaning compound to about 150 compounds and chemical specialities, ranging from pickle control solutions for acid baths in steel processing to phosphate coatings for metals and compounds for decontaminating surfaces subjected to radioactivity.

Oakite's laboratories occupy 30,000 square feet of space, manned by chemists and technicians. Working as teams in individual laboratory sections, they cover the broad field of surface chemistry, developing an average of 12 new products a year. The company's attention to research has been closely related to the development of its field service staff. Cleaning in the laboratory is not the same as cleaning in actual production—soils, water conditions, surfaces, facilities vary markedly from plant to plant. The company feels that it is only in actual in-plant use that the chemists' compounds can prove themselves.

The Oakite field service staff, numbering some 250 trained men in the U.S. and Canada, is charged with the dual responsibility of selling and servicing the compounds so that the customer gets the most efficient operation at the lowest price; and alerting the laboratories to new industrial needs in the field of surface treatment.

Research chemists at work in Oakite's customer service laboratory.

John A. Carter, president of Oakite, has remarked on his company's 50th anniversary, "We recognize that our business is nothing if not dynamic and that progress today must be based on continuing research that will result in new and improved products and methods for cleaning and sanitation tomorrow."

Hodag Forms New Department

► Hodag Chemical Corp., Chicago, Ill., has formed a Technical Services Department, which will be supervised by Y. Snider, research chemist. Mr. Snider, who has been with Hodag for three years, was previously associated with the Army Chemical Corps Research Center in Maryland. He holds B.S. and M.S. degrees in chemistry from the University of Chicago.

The new department, which represents a major expansion of the company's laboratory resources, will analyze customers' processing problems related to foaming and other forms of surface activity. Application studies will be made in Hodag's laboratory which simulate customers' manufacturing processes. When the processes can not be duplicated, a member of the Technical Services Department will join a Hodag sales engineer and will work with customers' engineering personnel in the field. Company products will be tested in connection with customers' materials and systems to determine their suitability to the problem at hand. New testing equipment has been added for this purpose.

Retires From Raybestos-Manhattan

► William H. Steinberg, technical consultant and former sales manager of the Abrasive Wheel Department for the Manhattan Rubber Division of Raybestos-Manhattan, Inc., Passaic, N. J., has retired after 41 years with the firm. Mr. Steinberg, a chemical engineering graduate of the University of Wisconsin, started as a development engineer in the Abrasive Wheel Department in 1917 and became sales manager some time later. Previously, he had been with the Cutler-Hammer Co., Milwaukee, Wisc.

Mr. Steinberg made what is considered his largest contribution to industry in connection with the development of Manhattan's line of the cut-off wheels. As a member of the Safety Committee of the Grinding Wheel Institute, he helped write the Safety Code adopted by the American Standards Association. Before concentrating on the cut-off wheel, he made notable contributions in the development and promotion of foundry and billet snagging and portable grinding wheels with special emphasis on finishing of stainless steels.

West Coast News

► Raymond H. Perkins has been named West Coast manager for the Farrel-Birmingham Co., Inc., Ansonia, Conn., with offices located at 2032 Santa Fe Ave., Los Angeles 21, Calif. He succeeds Paul R. Oliver, who has retired after serving as manager for ten years. Mr. Perkins has been assistant West Coast manager since 1954. He joined Farrel-Birmingham at the company's headquarters at Ansonia in 1941, and worked in various manufacturing and engineering capacities until 1948. He was then transferred to the sales division and served as New England sales engineer until he moved to the West Coast.

► B. F. Goodrich Co., Akron, Ohio, has appointed Harry Beeson as chief chemist at its Sao Paulo, Brazil plant. Mr. Beeson, formerly manager of compounding at the Goodrich Los Angeles plant, has been with the company for over 17 years. W. N. Wasson succeeds Mr. Beeson as manager of compounding. Mr. Wasson, with the company 19 years, recently managed its Cuba plant. The company also announced the appointment of "El" Shaw as purchasing agent at its Los Angeles tire plant, replacing Larry Finley. Mr. Shaw is a graduate of Kent State University and was the crude rubber buyer while in Akron.

► The Silicone Products Department, General Electric Co., Watertown, N. Y., has announced its plans to bring its silicone rubber technology school to Los Angeles during the week of March 16-20. The course, consisting of five one-day sessions, will cover the technical aspects of silicone rubber compounding and fabrication.

► Molded Products Division of the Stauffer Chemical Co., has appointed Thomas A. Williams as assistant to the general manager; W. S. Gillon as plant manager, and William K. McPherson as production manager.

► Standard Products Co., Cleveland, Ohio, has announced the promotion of James S. Reid, formerly director of industrial relations, to manager of the company's West Coast Division at Fullerton, Calif. Charles T. Gue will succeed Mr. Reid as the company's director of industrial relations. Mr. Reid, a graduate of Harvard Law School, practiced law for four years before joining Standard Products in 1956. Mr. Gue joined Standard Products in 1951 as a personnel supervisor and was promoted to assistant director of industrial relations earlier this year. He is a graduate of Ohio University and the Cleveland Marshall Law School.

► Glenn E. Lucas has been named president of Lurado Manufacturing Co., Anaheim, Calif. Mr. Lucas formerly was western manager, resin and latex sales, Firestone Tire & Rubber Co. According to Mr. Lucas, Lurado will be producing vinyl dispersions, coatings and adhesives.

► Pacific Moulded Products Co., Los Angeles, Calif., has announced its acquisition of all the principal assets of Lomita Rubber Co. Pacific has moved all production equipment to its main plant at 905 East 59th St., Los Angeles.

► Rubber Machinery, Inc., El Monte, Calif., has been named exclusive western representative for Stewart Bolling & Co., Cleveland, Ohio. J. C. Johnson, formerly with Pacific Telephone Co., has been named sales manager.

► The Vopcolene Division of Emery Industries, represented in Los Angeles by the D. E. Dougherty Co., has announced a $750,000 plant expansion. The purpose of the expansion is to better serve the rubber industry.

► Ed. Lynch of the C. L. Chemical Co., Los Angeles, Calif., has announced that Everett Johnson has joined his staff as technical representative.

New Enjay Butyl Package

► Enjay Co., Inc., New York, N. Y., has announced that all grades of Enjay Butyl, except 165, are available in a new multi-unit package. According to the company, this new package, consisting of 48 individual bales, polyethylene wrapped and weighing approximately 2800 pounds, has been designed for customer convenience in unloading handling and storing Enjay Butyl. The company reports that the advantages of the new package are fast unloading; fast convenient handling; ease of storage; and protection of product.

Shell Synthetic Rubber Packaging

► Synthetic Rubber Sales Division of the Shell Chemical Corp., Torrance, Calif., has announced the development of a package for the storage and handling of styrene-butadiene synthetic rubber. The new package, called "Flotainer", is a strong, lightweight, steel strapped wooden container reinforced at strategic points to withstand the heavy pressure of settling bales, the company stated. Flotainer is said to prevent bale deformation and film rupture during critical storage and shipping periods by controlling cold flow.

Subsidiary Officers Elected

► New officers have been elected for each of the major operating subsidiaries of United Carbon Co., Charleston, West Va. R. W. French, who is president and a director of the parent company was elected president of United Carbon Co., Inc., and executive vice-president of United Rubber & Chemical Co. A. G. Treadgold was chosen senior vice-president of United Carbon Co., Inc., and H. E. Norrick was named senior vice-president of United Producing Co., Inc.

John H. McKenzie, director of research and development for United Carbon and all subsidiaries, was chosen a vice-president of United Carbon Co., Inc., and of United Rubber and Chemical, and was elected a director of the three subsidiary companies. Harold B. Lawson, an officer and controller of the parent company, was elected to board membership for the three major subsidiaries. He also was named assistant secretary and assistant treasurer for both United Carbon Co., Inc., and United Producing, and secretary and assistant treasurer for United Rubber & Chemical.

Frank Lindeman Jr., general manager of oil and gas operation for United Carbon, was elected executive vice-president and a member of the board of directors of United Producing, which is the parent company's oil and gas operations subsidiary. In addition, he was elected a director of the other two major subsidiaries. Two other United Producing vice-presidents also were elected. They are John M. Capito, the company's Appalachian area oil and gas operations manager, and Cramon Stanton, manager of exploration.

Strobel Named Plant Manager

► Firestone Tire & Rubber Co., Akron, Ohio, has appointed E. H. Strobel as plant manager in the company's Des Moines, Iowa, plant, succeeding J. C. Blue, who retires on January 31. James E. Trainer, Jr., formerly assistant production manager, succeeds Mr. Strobel as production manager. Mr. Strobel was graduated from Ohio State University with a B. S. degree in engineering and later received an M. S. from the University of Akron on a Firestone Fellowship. Shortly after he joined Firestone in 1941, he left for duty with Army Ordnance. He returned to the company after five year's service. Mr. Strobel was a plant manager from 1948 to 1954 at the company's tire plant in Buenos Aires, Argentina. He left that position when he was assigned to Des Moines. Mr. Trainer is a graduate of Culver Military Academy and later, he attended Cornell University. He has held production management positions in both Memphis and Des Moines. During the Korean War, Mr. Trainer served in Army Ordnance.

G. Thomas Parker

Farrel-Birmingham Names Parker

► Farrel-Birmingham Co., Inc., Ansonia, Conn., has announced the appointment of G. Thomas Parker to the staff of the company's Midwest office located in Chicago, Ill. He will assist in the sales of rubber and plastics machinery and other Farrel-Birmingham products in the midwestern states served by that office. Mr. Parker graduated from the University of Connecticut in 1954, and after serving in the U. S. Army, joined the company in 1956. He completed a two year course of in-company training in engineering and sales prior to his current appointment.

Angier Double-Face Tape

► A pressure-sensitive translucent film adhesive, said to be an excellent medium for laminating to open and closed-cell foam materials such as vinyl, polyurethane, polyester or rubber foam, has been manufactured by Angier Adhesives, Cambridge, Mass. Named "Double-Face," it is reinforced by a non-woven tissue and supported for shipping by a protective release paper. Double Face can be combined conventionally or with a special applicator. The company said that the bonding strength of Double-Face applied to porous foams is considerably higher than that obtained with equivalent applications of liquid adhesives, due to a special reinforcing membrane which prevents excessive penetration. Double-Face contains no injurious solvents and can be used on any surface without fear of swelling or distortion, reported Angier.

Sinclair Announces Name Change

► Sinclair Chemicals, Inc., New York, N. Y., has changed its name to Sinclair Petrochemicals, Inc. A wholly owned subsidiary of the Sinclair Oil Corp., the organization will continue with all personnel, offices and operations remaining unchanged.

DuPont Appoints Three

► E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., has announced the transfer of John G. Armistead, manager of the company's Montague, Mich., works, to the Elastomer Chemicals Department at Wilmington. Harry B. Eaton, who has been assistant manager of the company's Louisville Neoprene works, has been named to succeed Mr. Armistead as manager of the Montague plant. DuPont also announced the transfer of John C. Weyrich from the post of assistant manager at Montague to manager of the group supervising the new neoprene plant now under construction at Londonderry, North Ireland.

Mr. Armistead joined DuPont in 1936 as a chemist. He has a chemical engineering degree from the University of Richmond. Mr. Weyrich graduated from the University of Michigan in 1940, and received his M.S. degree in chemical engineering the following year. He joined DuPont in 1941. Mr. Eaton worked on construction for the company during the summers of 1936 and 1937 while attending Cornell University. He graduated from Cornell in 1938 with a degree in mechanical engineering.

Detroit Group Elects Officers

► The Detroit Rubber and Plastics Group elected 1959 officers and executive committee members at its December meeting. The following members were elected for 1959: *Chairman,* W. F. Miller (Yale Rubber); *Vice-Chairman,* W. D. Wilson (R. T. Vanderbilt); *Secretary,* S. M. Sidwell (Chrysler Corp.); *Treasurer,* P. V. Millard (Automotive Rubber); *Membership Chairman,* J. Masden (U. S. Rubber); *Educational Chairman,* F. G. Falvey (DuPont); *Publicity Chairman,* P. Weiss (General Motors Research); *Entertainment Chairman,* R. C. Chilton (Permalastic Products); *Program Chairman,* R. W. Malcomson (DuPont); and *Historian,* T. W. Halloran (Chemical Products).

French Plan Conference

► Institut Francais du Caoutchouc, with the assistance of various French technical societies, has announced plans for an international conference devoted to the problem of tires and roads. The conference will be held in Paris on May 20 through 22. Those interested in participating in the conference should address Mr. R. Hublin, Institut Francais du Caoutchouc, 42 Rue Scheffer, Paris 16e, France.

Henry E. Wieditz

Promoted By Universal Oil

► Universal Oil Products Co., Des Plaines, Ill., has appointed Henry E. Wieditz, who formerly did research on antiozonant applications, as a sales representative for antiozonant products. Before he joined Universal Oil, Mr. Wieditz worked in production compounding and tire development at the Oaks, Penna., and Akron, Ohio, plants of the B. F. Goodrich Co. He is a graduate of Iowa State College and a member of the American Chemical Society and the Chicago Rubber Group, Inc.

Monsanto Announces Price Cut

► Plastics Division of the Monsanto Chemical Co., Springfield, Mass., has announced a decrease of 7/10c per pound in the bulk price of rubber grade styrene monomer, based on a revised price escalation effective April 1, 1959. The new base price will be 12c a pound. At the same time, the company announced the completion of a 40-million pound expansion in the rated capacity of the company's styrene monomer plant at Texas City, Texas, which is said to make it one of the largest styrene monomer installations in the world. A company spokesman said the price reduction was made possible by the increased capacity; the potential for a further capacity boost; and the reduction in market prices of benzene, a major styrene monomer raw material.

Named Sturtevant Treasurer

► Clayton F. English, executive vice-president of the Sturtevant Mill Co., Dorchester, Mass., has been named treasurer of the corporation, succeeding Joseph L. Sturtevant, who died recently. Mr. English will also continue to serve as executive vice-president. Previously associated with the Shipbuilding Division of the Bethlehem Steel Co. in a management capacity, Mr. English joined Sturtevant in 1947 and became executive vice-president in 1957.

Canadian News

► Dominion Rubber Co., Ltd., Montreal, Quebec, Canada, has announced the appointment of M. F. Anderson, formerly general manager of the Naugatuck Chemicals and Latex and Reclaim Divisions, to the post of executive vice-president, and his election to the board of directors. The company also has announced the appointment of R. Bruce Marr as general manager of the Naugatuck Chemicals and Latex and Reclaim Division, succeeding Mr. Anderson. Frank D. Evans has been named to succeed Mr. Marr as manager, Naugatuck Chemicals Division, Elmira, Ontario.

Mr. Anderson was born in Maxville, Ontario, and obtained his B.A. degree at McMaster University in Hamilton. He joined Dominion Rubber in 1927 as director of central industry engineering. In 1934, he was sales manager of the Central Division in Toronto and in 1939, he was placed in charge of new products development. Later, Mr. Anderson became general manager of the Naugatuck Chemicals and Latex and Reclaim Divisions.

Mr. Marr was born in Dorchester, Ontario, and attended London Collegiate Institute, London, Ontario, and the University of Toronto, graduating with a B.A. degree in science. He joined Dominion Rubber in 1922 and transferred to Montreal in 1928 as head of the general laboratories, later becoming assistant general manager of the Mechanical Goods Division. In 1941, he was appointed manager of the Naugatuck Chemicals Division in Elmira.

Mr. Evans, a native of Toronto, graduated from the University of Toronto with a B.A. degree in science. He joined the Naugatuck Chemicals Division of Dominion Rubber at Elmira in 1945, as a chemist in the Development and Production Department. In 1946, he was named sales manager of the division.

► S. G. Fearman has been appointed director of manufacturing and sales services for the Goodyear Tire & Rubber Company of Canada, Ltd., Mr. Fearman, formerly plant manager at New Toronto, Ontario, will be in charge of a new grouping of divisions dealing with all raw materials and physical distribution of finished products including purchasing, merchandise distribution, traffic and export, and a new Warehousing and Shipping Division.

► Nuodex Products of Canada, Ltd., has announced the appointment of G. H. Clifford Smith, previously executive vice-president, as president, succeeding William B. Bate, who was named chairman of the board. John F. Lang, vice-president in charge of commercial development, was named executive vice-president.

► The Rubber Association of Canada has opposed the tariff proposals on synthetic yarns and fabrics which have been made by the Primary Textile Institute. Because the problems of the tire fabrics industry are different from those facing other manufacturers of synthetic yarns and fabrics, the Canadian Tariff Board has been conducting hearings about them. Yarns and fabrics used in tire manufacture are heavier than most other synthetic yarns and fabrics and require more expensive capital equipment to make.

The Primary Textiles Institute, which represents most Canadian textile manufacturers, has asked for big duty increases including a doubling of British preferential rates. One proposal is to place a 20 per cent BP rate on an item that now enters Canada free under BP. Yarn duty rates at present are equal to or slightly higher than the fabric rates. The reverse, according to PTI, should be true so that there would be protection to cover costs of weaving yarn into fabric within Canada.

The PTI proposals were opposed by the Rubber Association of Canada, which represents a group of Canadian tire manufacturers, and by Industrias Consolidas de Matanzas SA, a Cuban exporter of tire yarns and fabrics to Canada. Canada uses about 30 million pounds of synthetic tire yarn and fabric annually with about one-third being imported, mainly from the U. S.

► Earl D. Gunn has been appointed vice-president and elected a director of B. F. Goodrich Sponge Products Canada Ltd., Waterville, Quebec. Mr. Gunn succeeds M. Frank Fitzgerald who has been named managing director of the B. F. Goodrich operation in Brazil. Mr. Gunn joined the company in 1936 as as accountant and moved progressively through automotive sales, purchasing and personnel before becoming general manager of staff services in 1954. Prior to his present appointment, he had been manager of manufacturing for sponge and plastics operations. Mr. Fitzgerald joined the company in 1952, later becoming purchasing agent and production manager. In 1956, he was made vice-president and general manager.

► Dow Chemical Co. of Canada has announced that the first shipment of high density polyethylene from its new Sarnia, Ont., plant is scheduled for March. The company is currently engaged in a national market development program on high density polyethylene.

MCA Plastics Group Sponsors Study

► Plastics Group of the Manufacturing Chemists Association, Washington, D. C., is sponsoring a basic research project into the behavior of polymeric or plastic materials in the solid state, which has been undertaken at the Case Institute of Technology, Cleveland, Ohio. This is another phase in the group's three-fold objective to promote research that will increase basic understanding of the physical behavior of plastics; to train students in the science and technology of plastics; and to act as liaison between the plastics industry and university and professional organizations.

The research, conducted under a $15,000 annual grant, will be directed by Selby M. Skinner, associate professor of Chemistry at Case Institute. Professor Skinner has previously directed research work related to some of that which is now in progress. Initial studies will be devoted to precision tensile tests, their correlation with measured moduli and the utilization of results to develop clues as to the mechanisms involved when plastics materials fracture. Experiments will be designed to cover areas hitherto incompletely explored.

Export List Revised

► The U. S. Department of Commerce has announced that removal of more than 250 items from its positive export list and the addition of 80 new items. Among the items deleted from the list were crude natural rubber and latex; copolymers of isobutylene and isoprene or other diolefins; polyvinyl butyral; and polyethylene with a molecular weight over 10,000. Added to the list were copolymers of methyl vinylpyridine and butadiene; fluorinated silicone compounds; and silicone rubber compounds and manufactures. Items removed from the list can now be exported under general license to all countries with the exception of Macao, Hong Kong and Soviet Bloc nations. Items remaining on the list can be shipped only under individual export license.

Mobay Develops New Technique

► Mobay Chemical Co., Pittsburgh, Penna., has announced the development of a new method for producing polyether urethane foam cushioning material. According to Mobay, the new technique is a one-shot system that greatly simplifies the production cycle for converting basic urethane chemicals into commercial cushioning slab stock. It is reported to eliminate much of the premixing of basic ingredients and simplifies the curing requirements while producing polyether foams that meet the commercial standards set for foams of equal density made by the complicated prepolymer method.

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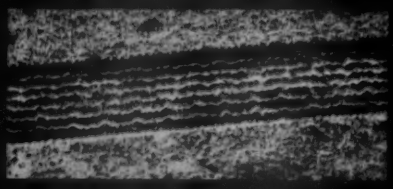
to here 

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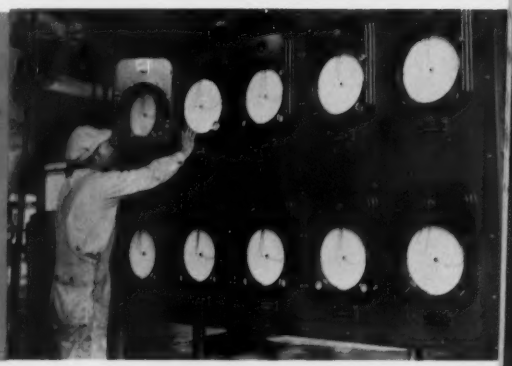

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STATEX B FF Fine Furnace

STATEX M FEF Fast Extruding Furnace
STATEX 93 HMF High Modulus Furnace
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Obituaries

Charles S. Redding

► Charles S. Redding, chairman of the board of directors and former president of Leeds & Northrup, Philadelphia, Penna., died on January 2, after a brief illness. He was 75 years old. Mr. Redding spent practically his entire business career with Leeds & Northrup. Born in Philadelphia, he joined the then Morris E. Leeds Co. as a draftsman in 1901. He graduated from the University of Pennsylvania in 1906 with a B.S. degree in electrical engineering. After teaching for two years he rejoined Leeds & Northrup in 1909 as a sales representative. In 1917, he became associate sales manager and shortly afterwards second vice-president. He became vice-president and treasurer in 1922, and in 1924, he became treasurer and factory manager. In 1928, he was named vice-president of engineering and development.

Mr. Redding was president of the company from 1939 to 1953, when he became chairman of the board. From 1941 to 1946, he was also president of the Franklin Institute, and from 1949 through 1951, he was president of the Scientific Apparatus Makers of America. In 1958, he received the SAMA award for "highest achievement in developing the industry's capacity for serving the nation in the fields of industry, research, education, health and defense."

Mr. Redding was an honorary D.Sc. of the University of Pennsylvania; director of the Philadelphia Electric Co.; director of the Electric Storage Battery Co.; director of the Philadelphia Manufacturers Mutual Fire Insurance Co.; and a member of the Board of Managers of the Saving Fund Society of Germantown. He was also a member of the American Institute of Electrical Engineers, American Physical Society and American Association for the Advancement of Science. He is survived by his wife, three sons and a daughter.

Joseph E. Kennedy

► Joseph E. Kennedy, board chairman of the Kennedy Van Saun Manufacturing & Engineering Corp., died on January 10 in his home at 45 East End Ave., New York, N. Y. He was 95 years old. Mr. Kennedy was a leading figure in the cement, mining and stone-crushing industries and had several hundred patents registered in his name. He was the founder of the Kennedy Van Saun Co., which has its headquarters at 405 Park Ave., New York City and a factory at Danville, Penna. Surviving are his wife and two daughters.

Verne E. Minich

► Verne E. Minich, founder of the Wheelabrator Corp., Mishawaka, Ind., and honorary chairman of the board, died on December 13 in New York City hospital following an illness of several months duration. Born on a farm in Kansas in 1867, Mr. Minich rose from a stationery and book salesman in Kansas and Nebraska, to sales and managerial positions with such firms as American Soda Foundation Co.; Haynes Automobile Co., Kokomo, Ind.; and Franklin Automobile Co., Syracuse, N. Y. He was also assistant to the general manager of the National Cash Register Co., Dayton, Ohio, and later, became advertising manager of that company.

Early in 1908, Mr. Minich acquired exclusive sales rights from the Stockham Homogeneous Sand Mixer Co., manufacturer of a mechanical sand conditioning machine for the foundry industry. Later that year, he took over this firm and started a new company, Sand Mixing Machine Co., to manufacture and sell a machine called the Sandcutter. In 1910, operations were moved to Cleveland, a line of anti-pressure sandblast cleaning machines added and the company name was changed to American Foundry Equipment Co.

Consolidations with other foundry equipment manufacturing plants followed until, in 1926, the headquarters and plant of the firm were established in Mishawaka. Later, with the introduction of the wheelabrator airless abrasive blast cleaning unit, the company name was changed to American Wheelabrator & Equipment Corp., and then in 1955, to Wheelabrator Corp.

Boyd E. Lutz

► Boyd E. Lutz, general supervisor for the General Tire and Rubber Co., Akron, Ohio, died unexpectedly after a heart attack on October 26. Mr. Lutz, who had been associated with General Tire for 23 years, had served that firm in Africa, Italy, Israel, Brazil and other parts of South America. Surviving are his wife, two sons and a daughter.

Kenneth B. Timm

► Kenneth B. Timm, chief chemist for the Dry-Color Division of Sinclair and Valentine Co., died of a heart attack recently at Ridgway, Penna. He was 59 years old. A graduate of Cornell University, Mr. Timm was a member of the American Chemical Society and the American Society of Textile Colorists. He is survived by his wife and son.

Fred S. Weida

► Fred S. Weida, supervisor of staff purchasing for the Goodyear Tire & Rubber Co. and long associated with the company's Far East rubber plantations, died in Akron, Ohio, on September 11. He was 62 years old. Mr. Weida joined the firm in 1916 and spent 23 years of service as office manager, financial agent, purchasing agent and manager of Goodyear's Dolok Merangir and Wingfoot Estate rubber plantations in Sumatra, Indonesia. He returned here in 1942 and was appointed assistant purchasing agent following an assignment with the Rubber Research Corporation in Washington, D. C. He was named supervisor of staff purchasing in 1946. Mr. Weida attended Howe Military School and Kenyon College and was an Army veteran of World War I. He is survived by his wife, a son and a daughter.

David F. Gill

► David F. Gill, vice-president and treasurer of National Latex Products Co., Ashland, Ohio, died suddenly on October 2 from a heart attack, while he was on a business trip in New York City. He was 33 years old. Mr. Gill was born in Ashland and was graduated from Ashland High School. A veteran of World War II, he entered the Navy shortly after graduation. Mr. Gill was active in Ashland civic affairs and among other organizations, he belonged to the Ashland Manufacturer's Council and was currently serving as a member of the Industrial Committee Division of the 1959 United Appeal Campaign. He is survived by his wife and three sons.

Paul E. L. Bruck

► Paul E. L. Bruck, sales representative for the Textile and Latex Industries of Stein Hall & Co., Inc., New York, N. Y., died suddenly on October 9 of a heart attack. He was 57 years old. Mr. Bruck joined Stein Hall in 1953 as a latex and rubber salesman. Subsequently, he took a sales assignment in the company's New York sales-branch office, where he specialized in textile liquid specialties and latex accounts. Before he joined Stein Hall, Mr. Bruck had been associated with the Revertex Corp. and the Rubber Corp. of America.

Thomas J. Bagley

► Thomas J. Bagley, executive vice-president of the R. M. Hollingshead Corp., Camden, N. J., died on December 6 at the Travistock Country Club in Haddonfield, N. J. He was 67 years old. Mr. Bagley had been with the company, which manufactures automobile accessories, for more than fifty years. He was a member of the Union League of Philadelphia and the American Chemical Society. He is survived by his wife and a daughter.

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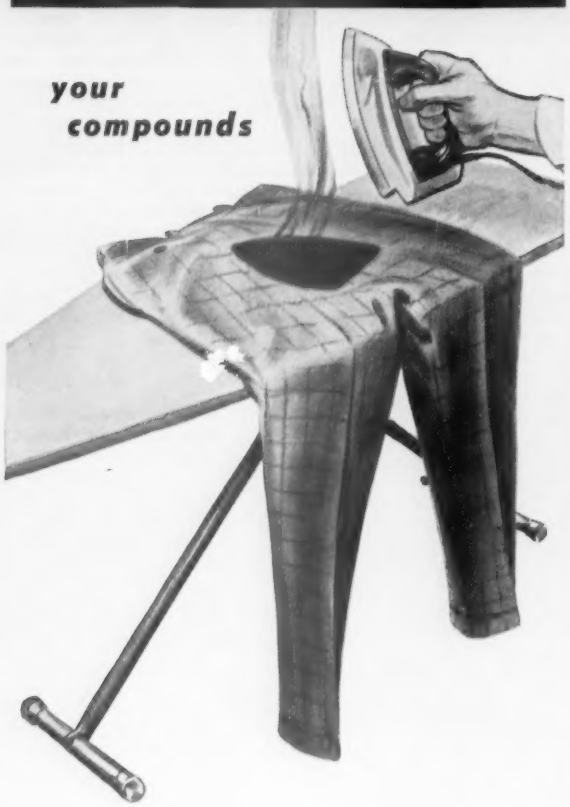

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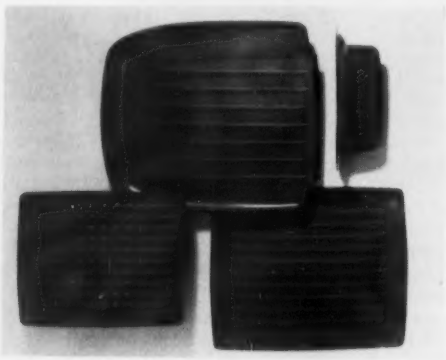
New Goods

New Kitchen Products

► Rubbermaid Inc., Wooster, Ohio, has introduced a newly-designed line of drainer trays, sink mats, stove mats and sink divider mats for kitchen use. A special feature of the drainer trays is the high side rims that sweep in an arc to the drain edge to provide quicker, more thorough drainage down the increased slope. There is less chance of spillover in this new design, which retains advantages of the original models — rubber-cushioned work space and waterproof surfaces to keep counter tops dry and new looking. The drainer trays are available in red, white, yellow, pink and turquoise and come in two sizes: 16¼ x 16¾ inches and 18¼ x 21¼ inches. The sink mats are designed to cushion the sink bowl to reduce breakage of china and glassware, and to prevent scratching of the sink bowl itself. In sizes of 10¾ x 12¾ inches and 12¾ x 16 inches, the mats come in red, white, yellow, pink and turquoise. Rubbermaid's new rubber stove mat has been redesigned in keeping with style, utility and service refinements in new stoves. These mats are available in five colors and in sizes 13¾ x 19½ inches and 16 x 20 inches. The sink divider mat has added new design features while keeping the cushioning function that prevents dish and glassware breakage during dishwashing. It is available in five colors and is 10½ x 14 inches in size.



Clear Plastic Ball

► Barr Rubber Products Co., Sandusky, Ohio, has introduced "Hi Vue" clear plastic balls, decorated in brilliant colors. This decoration only partially covers the plastic, thus permitting a see-through effect. The balls have plenty of bounce, and light is reflected and let through, giving them sparkle and glow. Hi Vue balls are made in three styles—scroll, pinwheel and parastripe. They are available in three sizes with diameters of 4⅜ inches, 5½ inches and 6½ inches.

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Acid Resistant Rubber Glove

► Pioneer Rubber Co., Willard, Ohio, has added a new medium weight glove, "Nimble Fingers V-20," to its Stanflex line. According to the company, the V-20 was tested in 50 per cent solutions of nitric and chromic acids, which are highly corrosive substances known to deteriorate both

rubber and synthetic gloves, and withstood the effects of both acids after 48 hours of immersion. Made of Pioneer's exclusive Pylox material, the V-20 is reported to be ideal for jobs requiring finger sensitivity since the non-binding design of the tapered fingers and roomy palms give bare-hand comfort to the wearer. According to Pioneer, the glove can also be turned inside out so the textured inside finish can provide a non slip grip.

Spiral Shaped Rubber Idler

► A new spiral shaped rubber idler for belt conveyors has been developed by Hewitt-Robins Inc., Stamford, Conn. According to the company, the new idler is highly flexible and adaptable to any type of belt conveyor, and is made of tough synthetic rubber molded around a wire rope. Although smaller in diameter and lighter in weight than conventional all-metal idlers, it carries the conveyor belts which ride over it smoothly and efficiently under either heavy or light loads, the company states. The idlers are available for belt widths of 18, 24, 30 and 36 inches.

All-Vinyl Flooring

► A complete new line of all-vinyl flooring has been introduced by the Goodyear Tire & Rubber Co., Akron, Ohio. Called "Supreme", the new .080 gauge line is for residential or light commercial application. The flooring is produced in 9 x 9 inch tile form only, and consists of 20 light decorator colors in four patterns. Color styles and patterns available include eight in terrazzo, five in romance, a plain black or white, and five in metallic.

Industrial Fire Hose

► B. F. Goodrich Industrial Products Co., Akron, Ohio, has developed an industrial fire hose which is reported to be so tough that a truck can run over it without causing a burst. According to Goodrich, the hose can be soaked continuously in mud holes, strung out in the dankest part of an underground mine for months at a time, or hung in an atmosphere heavy with acid fumes — all without hurting the hose. The company states that the new "Imperial" hose, made with an all-Dacron jacket, was originally designed for heavy duty service in oil refineries and chemical plants, and is recommending the hose for fire service in the contracting and mining industry, in general industrial plants, and on board ships. According to the company, the hose is designed to withstand surge pressures beyond its initial 500 pounds per-square-inch pressure test, has exceptional resistance to abrasion, and is impervious to mildew, oil, acids, alcohols, hydrocarbons and detergents. Ends of the new hose are reinforced with Goodrich's "Plylock" end protection. Imperial hose is available in 1, 1½, 2 and 2½ inch sizes.

Synthetic Rubber Industrial Tire

► Goodyear Tire & Rubber Co., Akron, Ohio, has developed a polyurethane type synthetic rubber solid industrial tire which is reported to have up to four times the wearing qualities of conventional industrial tires. Made from Neothane,

Goodyear's name for its cast polyurethane type rubber, the tires are designed for pallet roller wheels and steer wheels. According to the company, the new material has extremely high resistance to cutting and chipping, as well as excellent oil, weather and abrasion resistance characteristics.

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Send for BULLETIN 194SA

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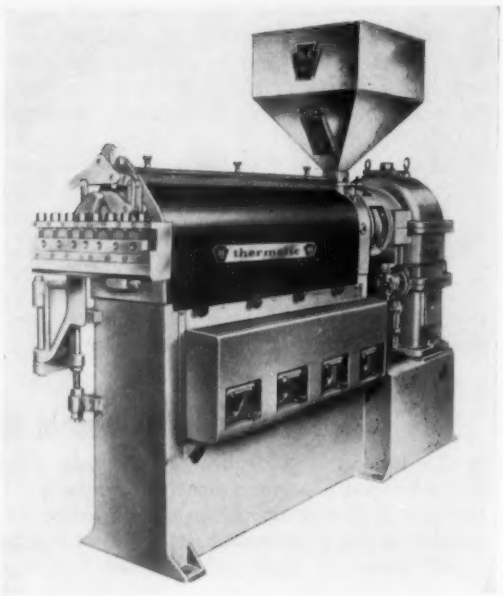
New Equipment

Davis-Standard Extruders

► A new line of themoplastic extruders, designated D-S Thermatic Series by the manufacturer, Davis-Standard Division, Franklin Research Corp., Mystic, Conn., is said to feature an entirely



new design which permits higher production capacity in all bore sizes than was ever before possible. Featuring helical or herringbone gear sets specifically designed for extruder drives, each model, with 2½, 3½, 4½, 6 and 8-inch bore sizes, can handle higher horsepower and therefore deliver higher screw speeds than previous models. Thrust bearings and other load carrying components have been increased accordingly to give the extruders the highest output capacities, says the manufacturer.

Automatic Spray Machine

► A new double vertical fixture automatic spray machine, a product of Conforming Matrix Corp., 317 Toledo Factories Building, Toledo 2, Ohio, is designed for fast, perfect finishing of one, two or three surfaces of generally oval or rectangular shaped pieces of varying length where fine mask definition and paint demarcation are necessary. If desired, small areas can be painted in one of the machine's two stations and large areas in the other, or parts may be sprayed a different color in each station. The machine can be operated so as to use either or both of the stations. It is said to enable one operator to double the production formerly requiring two hand sprayers.

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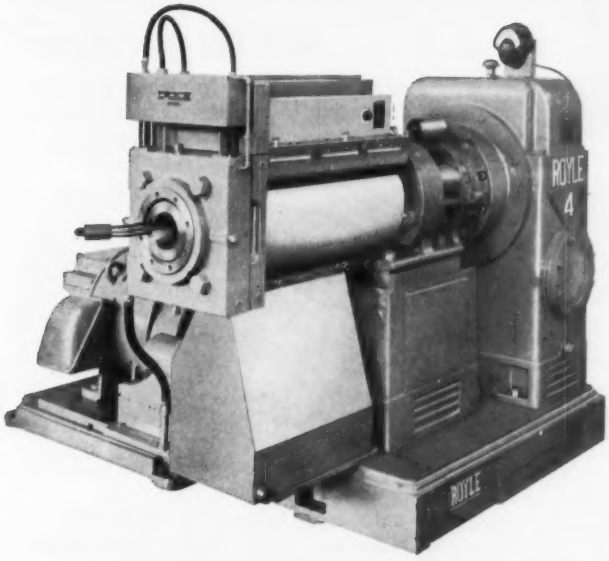

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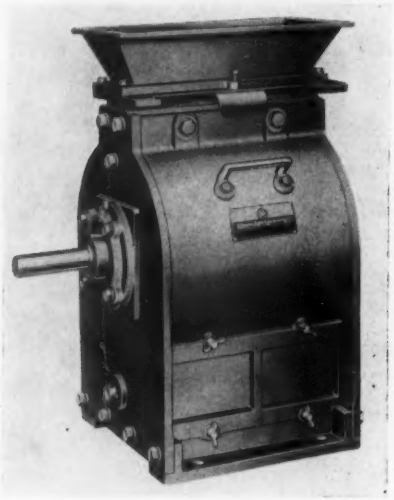
Rotary Knife Cutter

► A rotary knife cutter to be used for the reduction of a wide variety of materials, including rubber, has been developed by Munson Mill Ma-



chinery Co., Utica, N. Y. The machine comes in a variety of sizes with capacities varying from 1500-2000 pounds per hour to 6000-12,000. Power consumption of the machine is said to be low in relation to the work done.

Jordan Sight Glass Indicators

► OPW-Jordan monel Visi-Flo sight glass indicators are applicable to any installation where it is necessary to know what is happening inside a

pipe. The units, manufactured by Jordan Industrial Sales Division, OPW Corp., 6013 Wiehe Road, Cincinnati 13, Ohio, indicate direction, rate of flow, viscosity, color, clarity and purity of product. One model is available in sizes from ¼- through 2-inches, and others are available in sizes from ¾- through 4-inches. They are suitable for pressures up to 125 psi and temperatures to 225°F.

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3757—75 parts HAF black—37.5 parts highly aromatic extending oil —12.5 parts highly aromatic processing oil
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3759—60 parts ISAF black—37.5 parts aromatic extending oil

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NEW RUBBER MOLD RELEASE AGENT SAVES 10%

A new high viscosity silicone oil emulsion called LE-46 has recently been introduced by The C. P. Hall Co. Tire manufacturers and retreaders report up to 10% saving over conventional rubber mold release agents. LE-46 provides a more substantial, stable and durable film at mold temperatures, lends itself to automatic spray equipment because it "flats out" extremely well. Manufactured by: Union Carbide Corporation, Silicones Division. Sold by The C. P. Hall Co.

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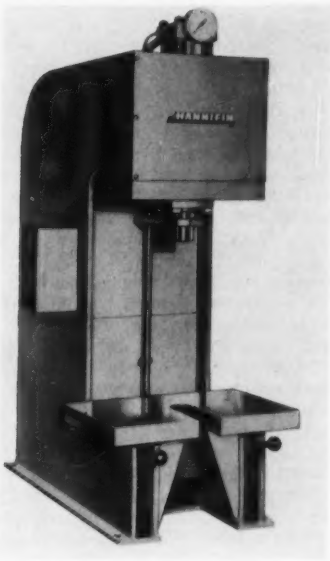
Hannifin Hydraulic Bench Presses

► New 6 and 8-ton high speed hydraulic bench presses, described as ideal for forming, trimming and force-fit assembly operations, have been announced by Hannifin Co., Des Plaines, Illinois. Dual hand and adjustable down-stroke controls



are standard on the presses; electric push button control with or without pressure reversal is available as an optional feature. The return stroke is adjustable, permitting shortening of the work cycle to the point that the ram just clears the work piece on repetitive operations. Tonnage is adjustable from 10% of capacity to full, rated capacity. The new presses have a 12-inch stroke —8-inch reach from throat of frame to centerline of ram, and 18-inches gap (or daylight). The 8-ton press has speeds of down, advance 525 ipm; down, feed 200 ipm; return, 330 ipm. Speeds on the 6-ton model are even faster.

► George W. Dahl Co., Inc., 430 High St., Bristol, Rhode Island, manufactures a **control valve** designed especially to regulate the flow of a corrosive product. Designated Model B-2260, the valve incorporates Teflon as a safeguard, though other materials are also available.

► A new **lift stacker** for handling rolled materials, developed by Grand Specialties Co., 3101 West Grand Ave., Chicago, Ill., is said to solve the problem of measuring, rerolling and stacking such materials as flat rubber. It handles roll sizes from 14 to 30 inches in width, and up to 60 inches in diameter.

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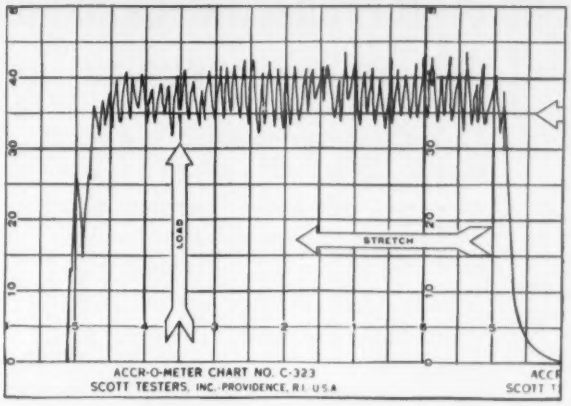

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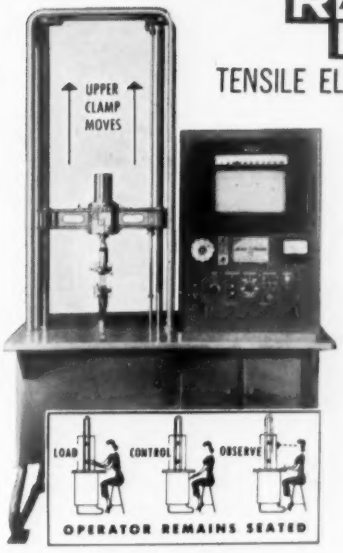
BRAND NEW SCOTT **CONSTANT RATE-OF EXTENSION** TENSILE ELONGATION TESTER



The registration of this adhesion test indicates a series of tears (release of bond) and demonstrates the response of the electric weighing system of the Scott CRE tester for this test, as well as for any test having a rapidly fluctuating load. Incidentally, this same tester may also be used in tests of tear, tensile, shear, compression, etc., of any material requiring loads of less than 1,000 lbs., and with up to 400:1 magnification of chart recording.

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Reviews

Effects of Radiation on Materials. Edited by J. J. Harwood, Henry H. Hauser, J. G. Morse and W. G. Rauch. Published by Reinhold Publishing Corp., 430 Park Avenue, New York 22, N. Y. 6¼ x 9¼ in. 356 pp. $10.50.

Twelve papers presented at a colloquium at Johns Hopkins University jointly by the Office of Naval Research and the Martin Co. are reproduced in this volume. Brought about by the need for greater understanding of the effects of radiation on materials, the program was designed to appeal to research scientists and engineers, as well as to manufacturers concerned with products for use in radiation fields. The papers deal with various materials affected by radiation, including organic and polymeric ones; theories and concepts of radiation effects; radiation sources and measurements of radiation, and known effects of radiation on the physical, metallurgical, mechanical, corrosion and electrical properties of the various materials. In addition, there is a discussion of current thinking on various reaction processes, e.g., graft polymerization.

Two of the papers, besides those dealing with theoretical or basic information, are of particular interest to the rubber industry: "Effects of Radiation on Behavior and Properties of Polymers," by A. Charlesby, and "Radiation-Induced Graft Polymerization," by A. J. Restaino. Both of these papers, in keeping with the character of the symposium, give basic but detailed explanations and data of value to both the technician and the person with an academic interest in what happens to a polymer under the influence of radiation. The timeliness of the publication and importance of the subject should gain more than passing interest for this volume. Each paper is concluded with a list of literature references, and an appendix bibliography of 779 references is given at the end of the volume. A subject index is also provided.

•

Man-Made Fibres. By R. W. Moncrieff. Published by John Wiley & Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. 5½ x 8¾ in. 662 pp. $9.75.

This book has already had two previous editions under the title, "Artificial Fibres." The new edition follows the outlines of the earlier ones, though the over-all information has been brought up to date and new fibers have been added to the list of those discussed.

The book is divided into five parts: (1) Structure and Properties of Fibers; (2) Regenerated and Modified Cellulosic and Alginic Fibers; (3) Regenerated Protein Fibers; (4) Synthetic Fibers; (5) Processing. In these five sections, which contain 44 chapters, the author has done a scholarly study in depth of the entire synthetic fibers field. He covers not only the technical but also the production aspects of his subject.

In the past 20 years the manufacture of man-made fibers has developed into a giant industry. It is today a field in which the rubber and plastic industries share, as large quantities of their products are consumed in producing the various fabrics. The author has written a book of value not only to those who manufacture the textiles, but to those who work in the various associated industries. The layout and presentation are excellent, matching the quality of the text.

A list of literature references follows each chapter, and a bibliography and subject index close the book. Also of interest is an extensive list of the trade names of various man-made fibers, an indication of the type of each, and the name of its producer. All countries which produce synthetics are represented on the list.

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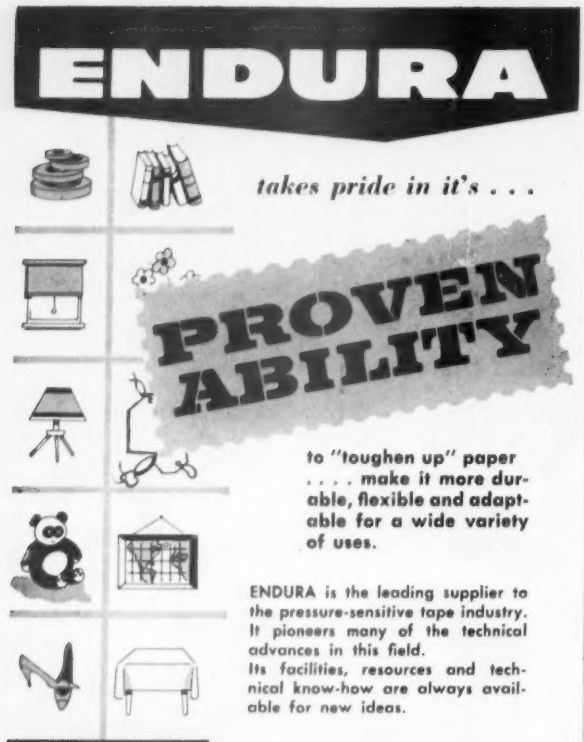
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CHEMISTRY OF NATURAL AND SYNTHETIC RUBBERS
by Harry L. Fisher
PRICE: $6.50* (postpaid-U.S.)

MANUAL OF RECLAIMED RUBBER
by John M. Ball
PRICE: $3.00* (postpaid-U.S.)
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BOOKLETS, CATALOGS, etc.

Waldron Web Process Engineering. (Catalog No. 10). John Waldron Corp., New Brunswick, N. J. 8½ x 11 in. 128 pp.

A variety of processing and mechanical units to take care of the many problems encountered in web processing operations is described in this thick catalog. A number of the machines, such as wrinkle and width controls, and tension controls and edge guides, are commonly used in manufacturing rubber products, and many others are widely used throughout industry. Sections are also devoted to auxiliary products, including plastic extruders and laboratory machines. Services and equipment of affiliated divisions of the company are also presented briefly. Information sheets furnish a guide to the type of data needed in a preliminary study of equipment application.

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Determinazione di piccolissime quantità di rame e manganese nelle gomme greggie e in alcuni ingredienti (Evaluation of Very Small Amounts of Copper and Manganese in Raw Rubbers and In Some Ingredients). By Aldo Fiorenza and Erminio Lombardi. Pirelli Co., Milan, Italy. 8½ x 11 in. 20 pp. (In Italian).

The methods for the colorimetric evaluation of copper and manganese indicated in the 1955 ASTM Standards and in proposals submitted to ISO/TC 45 during the same year are examined in this publication in the light of the many works published on the subject. A broad bibliography is given. A systematic control study of the various analytical phases is carried out to check the accuracy of the methods and their applicability to the analysis of some raw materials frequently used in the rubber industry. The results of several analyses made on raw rubbers and ingredients are given.

•

Evaluation of Non-Black Fillers for Colored Butyl Compounds: Group III—Clays. (Bulletin No. 104-3). Thiokol Chemical Corp., 780 North Clinton Ave., Trenton, N. J. 8½ x 11 in. 12 pp.

This publication covers the evaluation of clays as fillers for butyl rubber. Results obtained with different types of clays, with their trade names and suppliers, are indicated. A base formula is supplied, and data on the effects of the various clays on the physical properties of the stocks vulcanized at various cures given. How the clays influence extrusion properties is also analyzed in chart form. This brochure presents valuable information on materials which are probably the most commonly used non-black fillers in compounding both natural and synthetic rubbers.

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Piccolyte Resins. Pennsylvania Industrial Chemical Corp., Clairton, Penna. 8½ x 11 in. 8 pp.

Piccolyte Resins—pale, non-yellowing terpene polymers which are available in solid or solution form—are the subject of this bulletin. Physical, chemical and electrical properties of Piccolyte S-115-L, a new product designed for applications requiring extremely light colored resin, are listed. Physical and chemical data on other grades are also given, and two tables are devoted to compatibility with other resins and to solubility in common solvents. Graphs show viscosities of Piccolyte solutions. Included in a table of recommended uses for each of the grades which recommends application in general purpose rubber compounds, rubber belting and hose, rubber tile and other rubber products.

Flexzone 6-H. By F. B. Smith. (Bulletin No. 220-A.) Naugatuck Chemical Division, United States Rubber Co., Naugatuck, Conn. 8½ x 11 in. 12 pp.

An antioxidant-antiozonant for weather protection and flex cracking resistance in rubber is described in this bulletin. The chemical structure, compounding properties, typical physical properties and suggested applications are detailed. General tire compounding recommendations, with formulas, are given, and recipes for truck tread compounds with listings of physical properties are also included. Effects of varying the type of wax used as an additive are also enumerated, and comparisons with a commercial antioxidant in a sidewall compound are made. Photographs of the tires show results of testing the tread compounds, and also the testing apparatus.

•

Elmes Hydraulic Equipment for the Plastics Industry. (Bulletin No. 5200-A). Elmes Engineering Division, American Steel Foundries, 1150 Tennessee Ave., Cincinnati 29, Ohio. 8½ x 11 in. 12 pp.

Elmes hydraulic equipment for use in plastic production is illustrated and described in this booklet. Compression and transfer molding presses, a special line of small-size lightweight molding presses, hobbing presses, laboratory presses, high pressure pumps, and a pump-accumulator system are presented in detail. Photographs are used to show the various units, and specifications (size, weight, operating capacities, etc.) are given in tabular form. Text is employed to explain the features of the different units.

•

The Story of Technology. E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. 9 x 12 in. 36 pp.

This large pictures-and-text booklet deals with the effects of modern technology on contemporary life. The benefits it has brought to mankind, and its present size and complexity are developed in a series of topics, each illustrated with photographs, drawings and charts. The function of the large corporation in modern technology, and its contribution to its tremendous development, are a principal element of the story. A discussion of technological problems which must yet be solved, and of the potential fortunate future of mankind due to technological benefits closes the publication.

•

Goodyear Rims. Metal Products Division, Goodyear Tire & Rubber Co., Akron 16, Ohio. 8½ x 11 in. 94 pp.

This booklet is a multi-purpose catalog of information, pictures and engineering data on Goodyear rims, wheels, tools and rim accessories. The text offers information on rim research, on the step-by-step procedure for mounting and demounting rims, and on operating instructions for using hydraulic tools. Tables and schematic diagrams are also used to present the extensive information. A well designed, handsome and comprehensive presentation.

•

New Patapar Releasing Parchments. Paterson Parchment Paper Co., Bristol, Penna. 8¾ x 11¼ in. Looseleaf.

This unbound brochure contains samples and technical information on Patapar releasing parchments. Technical data sheets list properties, sizes, recommended uses and similar data. To each is attached a sample of the product it describes. Recommended uses involve applications where the parchments provide release action for synthetic rubber, polyurethane foams, and similar materials. Non-changing release action for most degrees of adhesion is a feature claimed.

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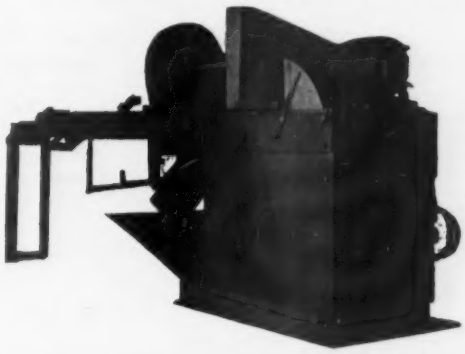

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Automatic Feed and Circulating Pump.
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MARKET REPORTS

TRENDS
NEWS
PRICES

Natural Rubber

Since our last report (January 2), the price of natural rubber on the New York Commodity Exchange has moved in a range of 100 points, high for the period being 30.75c reached on January 21 and 22, and low being 29.75c reached on January 28. The average price of spot rubber for the month of January was 30.34c based on 21 trading days. This compares with an average of 30.28c in the previous month.

Russian Buying Increasing

According to analysts at Merrill Lynch, Pierce, Fenner & Smith, rubber futures have been moving to new recovery highs paced by a resurgence of Russian buying and more optimistic auto sales reports. Russian buying has been, is, and probably will continue to be the main unpredictable in the futures markets, particularly Singapore.

The cessation last fall of Russian and Chinese buying in Singapore has weakened the market, but now Russia has been purchasing in steadily increasing quantities. Not only has Singapore been firming, but the reaction has spread to London and N. Y. It seems possible that the much increased imports by Russia and China of natural rubber could be exceeded in 1959, as their heavy buying was the probable standout feature of the 1958 rubber market.

Russia, it is believed, is not buying for stockpile but against requirements. Her purchases of all grades of RSS vs. only the top grades until lately indicate her increasing know-how and broader utilization of rubber together with a probable enlarged inventory requirement. The same has applied to Red China which has even been taking remilled rubber from Indonesia in the past few weeks.

Automobile Sales Up

With one of the best Decembers in history, auto sales are extremely favorable for the future. Despite the growing intrusion of foreign cars, domestic industry sources feel that more than 5.5 million cars can be manufactured this year as against the 4,244,021 last year. Trucks are doing much better, with total 1958 output at 870,000, the tally this year could easily be above one million.

Long Range Picture

By 1965, world consumption of natural and synthetic are seen at over four million tons per year. This would compare with the 3,175,000 tons last year. It would accommodate all the natural that could be produced, and for this reason, growers are trying to produce all they can.

NEW YORK, FEBRUARY 2, 1959

Price Data

Closing Rubber Prices on New York Commodity Exchange

FROM JAN. 1 TO JAN. 31

Jan.	Spot	Mar.	May	July	Sales
1	....	....	....	....	...
2	30.25	30.05	29.90	29.75	5
3	....	....	....	....	...
4	....	....	....	....	...
5	30.50	30.40	30.12	30.00	58
6	30.50	30.55	30.36	30.25	53
7	30.25	30.27	30.15	30.12	41
8	30.25	30.30	30.10	30.05	28
9	30.38	30.45	30.25	30.15	30
10	....	....	....	....	...
11	....	....	....	....	...
12	30.25	30.25	30.10	30.02	29
13	30.38	30.40	30.27	30.15	32
14	30.63	30.83	30.65	30.55	118
15	30.50	30.71	30.61	30.52	22
16	30.38	30.76	30.64	30.55	17
17	....	....	....	....	...
18	....	....	....	....	...
19	30.38	30.89	30.75	30.69	50
20	30.63	30.98	30.85	30.80	28
21	30.75	31.01	30.90	30.75	71
22	30.75	30.80	30.75	30.60	24
23	30.38	30.45	30.35	30.35	82
24	....	....	....	....	...
25	....	....	....	....	...
26	30.38	30.50	30.40	30.40	6
27	30.00	30.05	30.00	29.90	117
28	29.75	29.75	29.74	29.70	98
29	30.00	30.05	30.05	29.95	63
30	29.88	29.85	29.93	29.88	23
31	....	....	....	....	...

Outside Market

No. 1 Ribbed Smoked Sheets:	
Spot	.30
Mar.	.30
Apr.-June	.30
Thin Latex Crepe:	
Spot	.32
Thin Brown Crepe, No. 2	.28
Flat Bark Crepe	.23¼

London Market
(Standard Smoked Sheets)

March	29.11 — 29.26
Apr.-June	29.41 — 29.70

Singapore Market
(Standard Smoked Sheets)

Mar.	28.25 — 28.32

Middling Upland Quotations

	Jan. 2	February 2		
	Close	High	Low	Close
Mar.	34.70	35.33	35.09	35.15
May	34.84	35.37	35.18	35.28
July	33.81	34.48	34.23	34.23

Notes & Quotes

According to William O'Neil, president of the General Tire & Rubber Co., the future in the rubber industry is especially expansive as there are indications that demand will rise in 1959 and for years to come. Mr. O'Neil believes that if the automotive industry rebounds as expected, the industry faces the biggest production demand it has ever known.

Synthetic Rubber

Readers of the trade press will note the appearance of advertisements from foreign producers of synthetic rubber announcing the availability of their products to the American market. This fact is indicative of changes in the synthetic rubber market which will be felt more keenly in 1959.

Some estimates have it that a total of 300,000 long tons of synthetic rubber will be exported by domestic producers this year. In 1958, U. S. producers turned out something over 1 million long tons of synthetic rubber. There is said to be the capacity to produce 1.6 million long tons in this country.

Of the 1 million long tons produced in 1958 in the United States, about 870,000 long tons were consumed. Close to 200,000 long tons were exported in 1958. In the year before, a little more than 200,000 long tons were exported.

Free World Production

As 1959 progresses, synthetic rubber producers in the Free World will be better able to meet the requirements of their own countries. Moreover, they will be in a position to make some inroads on other markets.

The question must then be asked: What effect will these developments make upon synthetic rubber in this country? Will price adjustments be necessary by late 1959 or early 1960?

Realistically, foreign capacity to produce synthetic rubber will not be sufficient to pose a major threat to the American producer in the foreseeable future. If in the next few years, however, 100 to 200,000 long tons of synthetic were to be made available to the American market at prices that could not be met domestically, there would be difficulty. It is this type of situation that brings forth calls for protective tariffs, etc. This, however, falls contrary to current trends toward freer markets and relaxed import-export policies.

It would, of course, be foolish to create problems where none exist. The fact remains, however, that while the short-range outlook for the synthetic rubber industry is excellent, much of what may be expected in five or ten years remains clouded.

Short-Range Prospects

The way the new year is shaping up, it looks as though the U.S. will produce close to 1.2 million tons of synthetic rubber in 1959. Of this sum, it may reasonably be expected that about 200,000 long tons will be exported. This will leave natural rubber with a potential market of some 500,000 long tons in the United States. What with rising consumption of new rubber outside the U. S., it also seems likely that U. S. synthetic exports will stay at a 200,000 ton level for the next few years.

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RUBBER CHEMICALS DEPARTMENT

BOUND BROOK, NEW JERSEY

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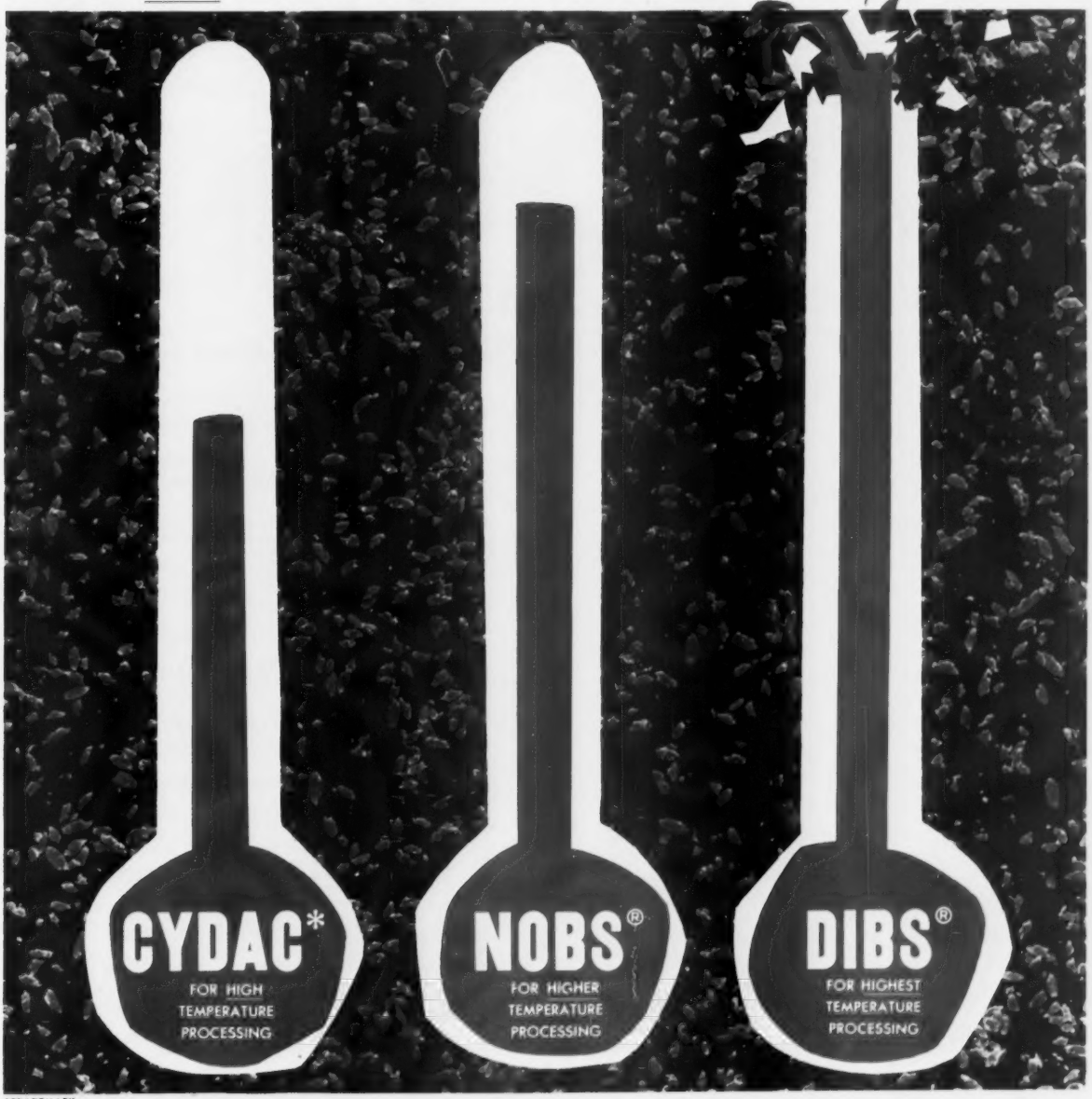


*TRADEMARK

PRICES OF COMMERCIALLY AVAILABLE SYNTHETIC RUBBER

Dry Rubber

(per pound carload)

Butadiene-Acrylonitrile Types

Butaprene NF	.4900 [1]
Butaprene NH	.6500 [1]
Butaprene NL	.5000 [1]
Butaprene NXM	.5800 [1]
Chemigum N1NS	.6400 [2]
Chemigum N3NS	.5800 [2]
Chemigum N5	.5800 [2]
Chemigum N6	.5000 [2]
Chemigum N6B	.5000 [2]
Chemigum N7	.5000 [2]
Chemigum N8	.5000 [2]
Chemigum N600	.5000 [2]
Herecol N-33	.6800 [2]
Hycar 1001	.5800 [2]
Hycar 1002	.5000 [2]
Hycar 1014	.6000 [2]
Hycar 1041	.5800 [2]
Hycar 1042 and 1043	.5000 [2]
Hycar 1312	.5000 [2]
Hycar 1411	.6200 [2]
Hycar 1432	.5900 [2]
Hycar 1441	.6200 [2]
Paracril AJ	.4850 [2]
Paracril ALT	.5000 [2]
Paracril B and BJ	.5000 [2]
Paracril BLT and BJLT	.5000 [2]
Paracril C and CLT	.5800 [2]
Paracril CV	.5900 [2]
Paracril D	.6500 [2]
Paracril 18-80	.6000 [2]
Paracril OZO	.4600 [2]
Polysar Krynac 800	.5000 [2]
Polysar Krynac 801	.5800 [2]
Polysar Krynac 802	.5000 [2]
Polysar Krynac 803	.5000 [2]

Butadiene-Styrene Types

Ameripol 1000	.2410 [2]
Ameripol 1001	.2410 [2]
Ameripol 1002	.2435 [2]
Ameripol 1006	.2410 [2]
Ameripol 1006 (crumb)	.2475 [2]
Ameripol 1007	.2410 [2]
Ameripol 1009	.2590 [2]
Ameripol 1011	.2475 [2]
Ameripol 1012	.2425 [2]
Ameripol 1012 (crumb)	.2490 [2]
Ameripol 1013	.2500 [2]
Ameripol 1013 (crumb)	.2615 [2]
Ameripol 1500	.2410 [2]
Ameripol 1501	.2410 [2]
Ameripol 1502	.2410 [2]
Ameripol 1703	.2060 [2]
Ameripol 1705	.2035 [2]
Ameripol 1707	.1910 [2]
Ameripol 1708	.1910 [2]
Ameripol 1710	.1885 [2]
Ameripol 1712	.1885 [2]
Ameripol 4650	.1820 [2]
Ameripol 4651	.1770 [2]
Ameripol 4652	.1425 [2]
Ameripol 4700	.1750 [2]
Ameripol 4701	.1725 [2]
Ameripol 4750	.1545 [2]
ASRC 1000	.2410 [2]
ASRC 1001	.2401 [2]
ASRC 1004	.2401 [2]
ASRC 1006	.2410 [2]
ASRC 1009	.2475 [2]
ASRC 1018	.2700 [2]
ASRC 1019	.2650 [2]
ASRC 1500	.2410 [2]
ASRC 1502	.2410 [2]
ASRC 1503	.2625 [2]
ASRC 1703	.2060 [2]
ASRC 1708	.1910 [2]
ASCR 3110	.2600 [2]
Baytown 1600	.1930 [2]
Baytown 1601	.1930 [2]
Baytown 1602	.1930 [2]
Baytown 1801	.1760 [2]
Baytown 1803	.1740 [2]
Carbomix 3750	.1820 [2]
Carbomix 3751	.1545 [2]
Carbomix 3752	.1870 [2]
Carbomix 3753	.1640 [2]
Carbomix 3754	.1790 [2]
Carbomix 3755	.1535 [2]
Copo 1500	.2410 [2]
Copo 1502	.2410 [2]
Copo 1505	.2610 [2]
Copo 1712	.1885 [2]
Copo 1773	.2060 [2]
Copo 1778	.1910 [2]
Copo 3900	.2310 [2]
FR-S 123	.1960 [2]
FR-S 127	.2600 [2]
FR-S 141	.2800 [2]
FR-S 146	.2410 [2]
FR-S 154	.1885 [2]
FR-S 155	.1885 [2]
FR-S 158	.3000 [2]
FR-S 173	.2060 [2]
FR-S 178	.1910 [2]
FR-S 179	.2410 [2]
FR-S 181	.2410 [2]
FR-S 1000	.2410 [2]
FR-S 1001	.2410 [2]
FR-S 1004	.2410 [2]
FR-S 1006	.2410 [2]
FR-S 1007	.2410 [2]
FR-S 1009	.2475 [2]
FR-S 1010	.2600 [2]
FR-S 1012	.2425 [2]
FR-S 1013	.2500 [2]
FR-S 1014	.2810 [2]
FR-S 1500	.2410 [2]
FR-S 1502	.2410 [2]
FR-S 1703	.2060 [2]
FR-S 1710	.1885 [2]
FR-S 1712	.1885 [2]
Naugapol 1016	.2650 [2]
Naugapol 1018	.2700 [2]
Naugapol 1019	.2650 [2]
Naugapol 1021	.3000 [2]
Naugapol 1022	.2800 [2]
Naugapol 1023	.2850 [2]
Naugapol 1503	.2625 [2]
Naugapol 1504	.2950 [2]
Philprene 1000	.2410 [1]
Philprene 1001	.2410 [1]
Philprene 1006	.2410 [1]
Philprene 1009	.2475 [1]
Philprene 1010	.2600 [1]
Philprene 1018	.2700 [1]
Philprene 1019	.2650 [1]
Philprene 1100	.1940 [1]
Philprene 1104	.1900 [1]
Philprene 1500	.2410 [1]
Philprene 1502	.2410 [1]
Philprene 1503	.2625 [1]
Philprene 1600	.1930 [1]
Philprene 1601	.1930 [1]
Philprene 1605	.1900 [1]
Philprene 1703	.2060 [1]
Philprene 1706	.2030 [1]
Philprene 1708	.1910 [1]
Philprene 1712	.1885 [1]
Philprene 1803	.1740 [1]
Plioflex 1006	.2410 [2]
Plioflex 1500C	.2410 [2]
Plioflex 1502	.2410 [2]
Plioflex 1507	.2410 [2]
Plioflex 1703	.2060 [2]
Plioflex 1710C	.1885 [2]
Plioflex 1712C	.1885 [2]
Plioflex 1713	.1750 [2]
Plioflex 1714C	.1725 [2]
Plioflex 1773	.2060 [2]
Plioflex 1778	.1910 [2]
Polysar Kryflex 200	.2510 [2]
Polysar Krylene	.2410 [2]
Polysar Krylene NS	.2410 [2]
Polysar Krynol 651	.1885 [2]
Polysar Krynol 652	.1910 [2]
Polysar S	.2410 [2]
Polysar S-50	.2410 [2]
Polysar S-X 371	.2550 [2]
Polysar SS-250	.2875 [2]
S-1000	.2300 [2]
S-1002	.2325 [2]
S-1006	.2300 [2]
S-1009	.2400 [2]
S-1011	.2325 [2]
S-1013	.2300 [2]
S-1100	.1850 [2]
S-1500	.2300 [2]
S-1502	.2300 [2]
S-1506	.2500 [2]
S-1600	.1825 [2]
S-1602	.1825 [2]
S-1703	.1950 [2]
S-1706	.1925 [2]
S-1707	.1800 [2]
S-1709	.1775 [2]
S-1712	.1775 [2]
S-1803	.1650 [2]
S-1804	.1750 [2]
Synpol 1000	.2410 [1]
Synpol 1001	.2410 [1]
Synpol 1002	.2435 [1]
Synpol 1006	.2410 [1]
Synpol 1007	.2410 [1]
Synpol 1009	.2475 [1]
Synpol 1012	.2425 [1]
Synpol 1013	.2500 [1]
Synpol 1061	.2410 [1]
Synpol 1500	.2410 [1]
Synpol 1502	.2410 [1]
Synpol 1551	.2410 [1]
Synpol 1703	.2060 [1]
Synpol 1707	.1910 [1]
Synpol 1708	.1910 [1]
Synpol 1711	.1900 [1]
Synpol 1712	.1885 [1]

Butyl Rubbers

Enjay Butyl 035 and 150	.2300 [2]
Enjay Butyl 165 NS	.2400 [2]
Enjay Butyl 215	.2300 [2]
Enjay Butyl 217	.2300 [2]
Enjay Butyl 218	.2300 [2]
Enjay Butyl 268 NS	.2400 [2]
Enjay Butyl 325	.2300 [2]
Enjay Butyl 365 NS	.2400 [2]
Polysar Butyl 100	.2450 [2]
Polysar Butyl 101	.2775 [2]
Polysar Butyl 200 and 300	.2450 [2]
Polycar Butyl 301	.2550 [2]
Polysar Butyl 400	.2450 [2]

Chlorosulfonated Polyethylene

Hypalon 20	.7000 [2]
Hypalon 30	.7000 [2]

Neoprene

	(prices l.c.l.)
Neoprene Types AC and CG	.5500 [2]
Neoprene Type AD	.5500 [2]
Neoprene Type FB	.6500 [2]
Neoprene Type GN	.4100 [2]
Neoprene Type GN-A	.4100 [2]
Neoprene Type GRT	.4200 [2]
Neoprene Type KNR	.7500 [2]
Neoprene Type S	.4200 [2]
Neoprene Type W	.3900 [2]
Neoprene Type WB	.4100 [2]
Neoprene Type WHV	.3900 [2]
Neoprene Type WRT	.4500 [2]
Neoprene Type WX	.4100 [2]

Polysulfide Rubbers

	(prices l.c.l.)
Thiokol Type A	.5000 [2]
Thiokol Type FA	.6900 [2]
Thiokol Type ST	1.2500 [2]

Silicone Rubbers*

	(prices l.c.l.)
GE (compounded)	2.50 [2]
GE Silicone Gum (not compounded)	4.00 [2]
Silastic (compounded)	1.90 [2]
Silastic (gums)	3.85 [2]
Union Carbide (gums)	4.00 [2]
Union Carbide (compounds)	2.50 [2]

Latex

(per pound carload)

Butadiene-Acrylonitrile Types

Butaprene N-300	.4600 [1]
Butaprene N-400	.5400 [1]
Butaprene N-401	.5400 [1]
Chemigum 200	.4900 [2]
Chemigum 235	.5400 [2]
Chemigum 236	.5400 [2]
Chemigum 245	.4600 [2]
Chemigum 246	.4600 [2]
Chemigum 247	.4600 [2]
Chemigum 248	.4600 [2]
Hycar 1512	.4600 [2]
Hycar 1551	.5400 [2]
Hycar 1552	.4600 [2]
Hycar 1561	.5400 [2]
Hycar 1562	.4600 [2]
Hycar 1571	.5400 [2]
Hycar 1572	.5100 [2]
Hycar 1577	.4600 [2]
Hycar 1852	.4600 [2]

POLYMERS

Butadiene-Styrene Types

Nitrex 2612	.4600 [1]
Nitrex 2614	.4600 [1]
Nitrex 2614-A	.4600 [1]
Nitrex 2615	.5100 [1]
Nitrex 2615-A	.5100 [1]
Nitrex 2616	.5400 [1]
Nitrex 2617	.4600 [1]
Nitrex 2617-A	.4600 [1]
Nitrex 2619	.5300 [1]
Nitrex 2620	.4600 [1]
Nitrex 2625	.4600 [1]
Copo 2101	.3000 [1]
Copo 2102	.3200 [1]
Copo 2105	.3200 [1]
Copo 2108	.3375 [1]
Copo 2110	.3200 [1]
Copo X-800	.2775 [1]
FR-S 2000	.2775 [1]
FR-S 2001	.2775 [1]
FR-S 2002	.3000 [1]
FR-S 2003	.3050 [1]
FR-S 2004	.3050 [1]
FR-S 2006	.2900 [1]
FR-S 2105	.3200 [1]
Naugatex 2000	.2775 [1]
Naugatex 2001	.2775 [1]
Naugatex 2002	.3000 [1]
Naugatex 2006	.2900 [1]
Naugatex 2105	.3200 [1]
Naugatex 2107	.3200 [1]
Naugatex 2108	.3000 [1]
Pliolite 2000	.2775 [1]
Pliolite 2001	.2775 [1]
Pliolite 2076	.2900 [1]
Pliolite 2104	.3200 [1]
Pliolite 2105	.3200 [1]
Pliolite 2107	.3200 [1]
Pliolite 2108	.3000 [1]
S-2000	.2775 [1]
S-2006	.2150 [1]
S-2101	.3250 [1]
S-2105	.3100 [1]
S-2107	.3200 [1]

Neoprene

Neoprene Latex 60	.4000 [2]
Neoprene Latex 571	.3700 [2]
Neoprene Latex 572	.3900 [2]
Neoprene Latex 601-A	.4000 [2]
Neoprene Latex 673	.5000 [2]
Neoprene Latex 735	.3800 [2]
Neoprene Latex 736	.3800 [2]
Neoprene Latex 842-A	.3700 [2]
Neoprene Latex 950	.4700 [2]

Polysulfide Rubbers

Thiokol Type MX	.8000 [2]
Thiokol Type WD-2	1.2500 [2]
Thiokol Type WD-6	.8000 [2]

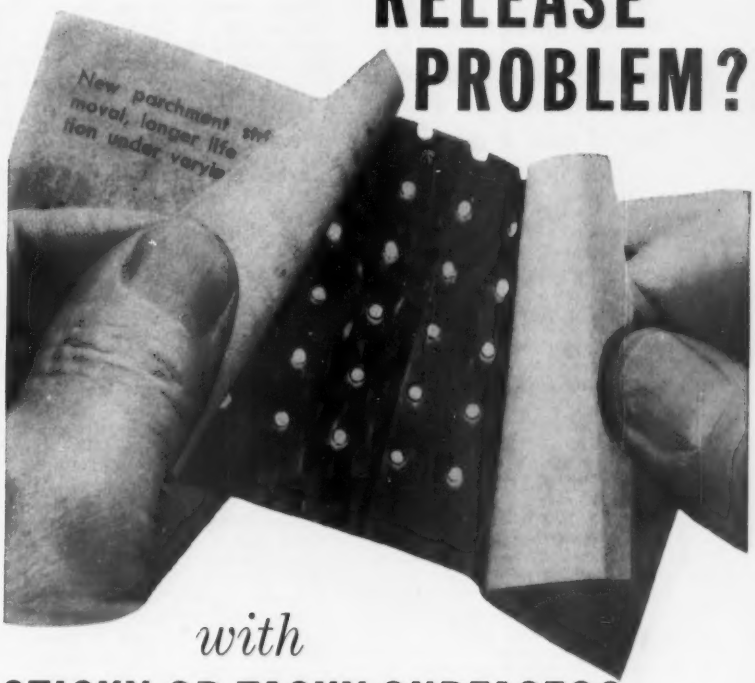
Notes: (1) Freight allowed. (2) Freight extra. (3) Freight prepaid. *Covers a wide range of compounds. Readers are urged to check specific prices with producers.

SUPPLIERS

Are Your Synthetic Rubbers Listed in This Section? if not Forward full information to **Market Editor** **RUBBER AGE** 101 West 31st St., New York 1, N. Y.

Do you have a

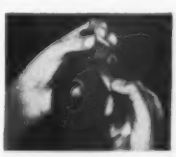
RELEASE PROBLEM?



with

STICKY OR TACKY SURFACES? ...RUBBER? ...PLASTICS? ...FILM CASTING?

Imparts satin-like finish to polyester Fiberglas sheets.



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HEADQUARTERS FOR VEGETABLE PARCHMENT SINCE 1885

MARKETS

(continued)

Reclaimed Rubber

According to figures released by the Rubber Manufacturers Association, a total of 260,178 long tons of reclaimed rubber were produced in the United States. This compares with the 273,989 long tons produced in the previous year.

RMA figures show that last year 247,720 long tons of reclaim were consumed in the United States, contrasted with the 266,852 long tons consumed in the previous year. As of December 31, 1958, there were 27,780 long tons of reclaimed rubber in stocks on hand.

By all accounts, 1958 turned out to be a far better year for the reclaimed rubber industry than many in the trade anticipated. Business conditions this year are expected to be such that the reclaimed rubber producer can look to even greater market activity.

This greater activity can be expected to push the consumption of reclaimed rubber to about 270,000 long tons. The last time this figure was reached was in 1956 when reclaim consumption hit 270,547 long tons.

(Prices for All Areas Except Calif.)

	per lb.
Premium Grade Whole Tire	.11½
First Line Whole Tire	.11
Second Line Whole Tire	.10½
Third Line Whole Tire	.10¼
Fourth Line Whole Tire	.09¾
Black Carcass	.15¼
No. 1 Light Colored Carcass	.22
No. 1 Peel	.11
Butyl Tube Reclaim	.14
Natural Rubber Black Tube	.16
Natural Rubber Red Tube	.21
Natural Rubber Gray Tube	.21

Scrap Rubber

Latest figures available from the Rubber Manufacturers Association indicate that 226,625 long tons of scrap rubber were consumed in the United States in 1958. At year end, there were 58,274 long tons of scrap on hand.

There has been little change in the scrap rubber market during the past few weeks. Dealers report a fair volume of business with reclaimers accepting most grades regularly. It is expected that better business conditions in 1959 will be reflected in the scrap market and it is anticipated that 1959 consumption will be in the order of 240,000 long tons.

(Prices Delivered Akron)

Mixed tires	ton	14.00
Light colored carcass	lb.	.04¾
No. 1 peelings	ton	28.00
No. 2 peelings	ton	25.00
No. 3 peelings	ton	21.00
Buffings	ton	16.00
Truck and Bus S.A.G.	ton	20.00
Passenger S.A.G.	ton	17.00
Natural Rubber Red Tubes	lb.	.07¼
Natural Rubber Black Tubes	lb.	.06½
Butyl Rubber Tubes	lb.	.05¾

Tire Fabrics

William E. Clark, vice-president and general manager for the Textile Division of the U. S. Rubber Co., recently stated that the textile industry now stands on the threshold of prosperity far better prepared than ever before. This, he said, is due to the increased range of products and the development of techniques and machinery necessary to extend this range.

According to Mr. Clark, reliable analysts have stated that the textile industry in general should see an 8 to 10 per cent rebound from 1958. Industrial fabrics in general are expected to beat this average and, in some special cases, surpass it. Tire cord figures are expected to exceed last year's output as a result of a 20 per cent estimated increase in new car sales and the accompanying demand for original equipment tires.

Throughout the industry, the increased demand for industrial fabrics has been anticipated. U. S. Rubber, for example, began a program to improve its position in this field last summer by creating a new Industrial Textiles Department. In this organizational change, U. S. Rubber consolidated previously independent sections of its Textile Division into a single unit, and began a realignment of production, research and sales facilities.

New machinery, such as the Clarkson Cord Former, for automating tire cord production, are also expected to be introduced at company plants in which industrial fabrics form the bulk of production.

Tyrex Sales Campaign

Tyrex, Inc., a New York association representing five major manufacturers of tire cord, has begun an extensive advertising, sales promotion and public relations campaign, slated to reach the replacement market. According to the association, "Tyrex" viscose tire cord, introduced last September, has already created a major impact on the tire cord industry. In original equipment alone, the association anticipates that 30 million casings will be made with Tyrex in 1959.

(Prices f.o.b. Shipping Point)

Rayon Tire Cord

1100	lb.	.73
1650	lb.	.67
2200	lb.	.67½

Nylon Tire Cord

210	lb.	1.95
840	lb.	1.70

Rayon Graded Fabric

1100	lb.	.69
1650	lb.	.63½
2200	lb.	.63

Cotton Chafers

8.9 oz. (per square yard)	lb.	.68
9.25 oz. (per square yard)	lb.	.66
11.65 oz. (per square yard)	lb.	.62
14.4 oz. (per square yard)	lb.	.71

Liquid Latex

Natural: A total of 66,130 long tons of natural rubber latex were imported into the United States in 1958 against the 77,085 long tons imported in the previous year. In 1958, 70,713 long tons were consumed, contrasted with the 75,009 long tons consumed in the preceding year. At year end, there were 8,625 long tons of natural rubber latex on hand.

Natural rubber latex is currently selling at about 36-37c per pound in car load lots at East Coast ports. The general outlook for 1959 is promising with certain reservations. One of these reservations has to do with price. If the price of natural rubber latex remains stable, at or near current levels, it is likely that this will be reflected in total consumption.

Another factor which must be considered is the continuing growth of plastic latices. This growth may have some impact on the over-all market. New and increased uses for latex do continue to present themselves, however, and it may reasonably be expected that natural latex consumption will be in the order of 75,000 long tons in 1959.

Synthetic: The synthetic latex market, noted for its stability, approaches the new year with bright prospects. In consideration of its lower price, it may be expected that usage will continue to grow, particularly in the foam field.

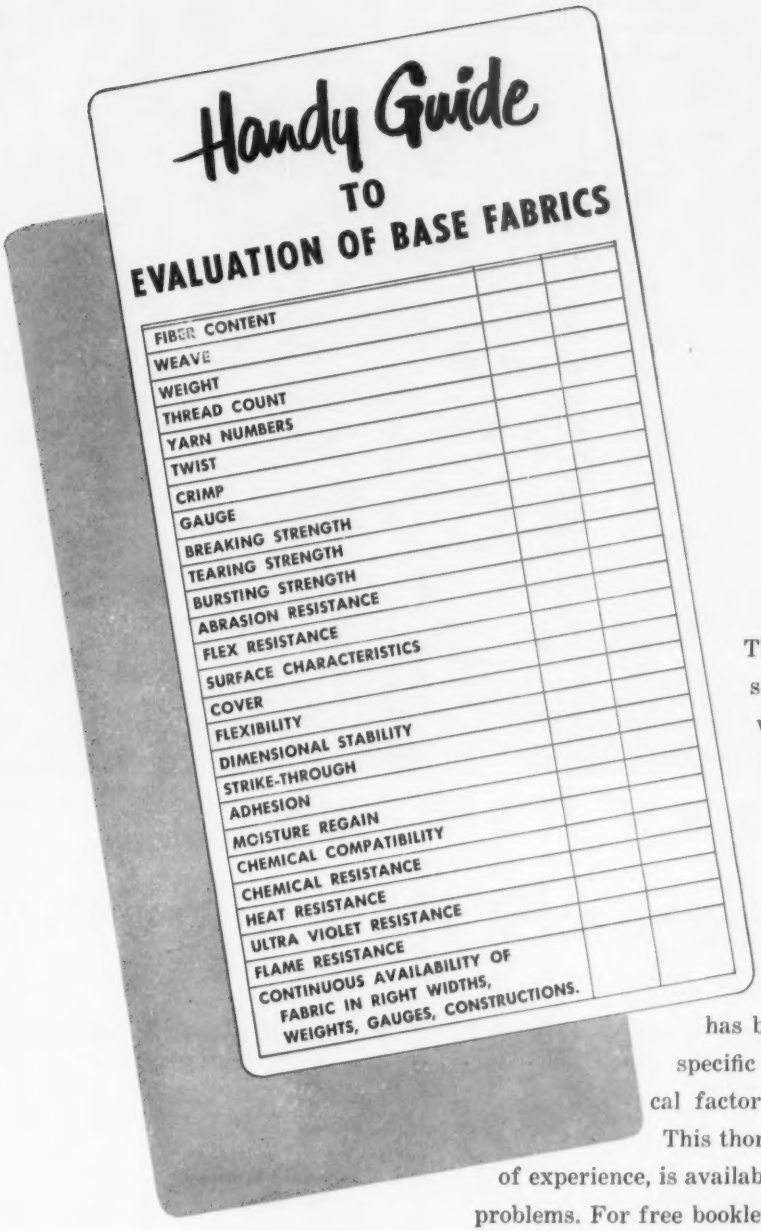
It is believed that supplies of natural rubber latex may not be equal to demand in 1959. Naturally enough, any gap will be filled by the synthetic latices. Many in the trade believe that the market for synthetic latices in the first half of 1959 will top the last half of 1958 by a good margin.

Cotton

The price of middling uplands cotton on the New York Cotton Exchange has moved in the very narrow range of 20 points since our last report (January 2), high for the period being 35.75c reached on January 27 and again on January 28, and low being 35.55c reached on January 20 and 21. The average price of middling uplands for the month of January was 35.67c based on 21 trading days. This compares with an average of 35.75c in the previous month.

Secretary of Agriculture Benson recently announced that he would meet competition in the world export markets for cotton beginning August 1, 1959. A trade source points out that a disturbing factor in this announcement was that pricing would be reviewed from time-to-time. If American cotton is not found to be competitive, adjustments will be made.

This decision is said to contradict the record of stability made in the past and is contrary to what might have been expected, the trade source states. He attributes the Benson statement to political pressure subject to reversal at a later date.



This fictitious "guide" has been created solely to show some of the factors which often have to be considered in the selection of a base fabric. They serve only to point up one fact: that there can be *no* such thing as a put-it-in-your-pocket guide in this field. But one thing is certain: when you're guided by Wellington Sears, you know that your base fabric has been considered in the light of your specific need, and that all significant technical factors have been thoroughly examined. This thoroughness, plus more than a century of experience, is available to help solve *your* working-fabric problems. For free booklet, "Fabrics Plus," write Dept. G-2.

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MARKET PRICES

CHEMICALS & COMPOUNDING INGREDIENTS

FEBRUARY 2, 1959

Prices are, in general, f.o.b. works and cover the domestic markets only. Export prices, as a rule, are usually slightly higher, due to packing regulations, special handling, etc.

Abbreviations: bbls., barrels; c.l., carload; cyl., cylinder; dlvd., delivered; dms., drums; eqld., equalized; l.c.l., less than carload; M.B. masterbatch; min., minimum; ref., refined; sap., saponified; sp., special; syn., synthetic; t.c., tank cars.

***Trademark. †For Export Only.**

The arrangement of this section closely follows the Chemical Section of the 1957-58 RUBBER RED BOOK. Readers are referred to that edition for the correct classification of any material or brand name. Suppliers of every material are contacted for price information. However, only those materials are listed for which quotations have been furnished within the past six months. The quotations are not guaranteed and prospective purchasers should contact suppliers for information. Suppliers are requested to send current price information to the Market Editor, RUBBER AGE.

ACCELERATORS

A-1 (Thiocarbanilide)*	lb.	.74	.81
A-32*	lb.	.66	.80
A-100*	lb.	.52	.66
Accelerator No. 8*	lb.	——	1.25
Accelerator—49*	lb.	.59	.60
Accelerator 89*	lb.	——	1.20
Accelerator 108*	lb.	.92	.97
Accelerator—552*	lb.	——	2.25
Accelerator—808*	lb.	.66	.68
Accelerator—833*	lb.	1.17	1.19
Accelerator B*	lb.	——	.89
Altax*	lb.	.54	.56
Amax*	lb.	.80	.82
No. 1*	lb.	.76	.78
Ancap*(†)	lb.	.38	.40
Ancatax*(†)	lb.	.48	.50
Ancazate BU (ET & ME)*(†)	lb.	——	1.07
Ancazide ET*(†)	lb.	——	1.07
ME*(†)	lb.	——	1.14
Arazate*	lb.	——	2.25
Arquad 12*	lb.	.55	.61
Beutene*	lb.	.66	.71
Bismate, Rodform*	lb.	——	3.00
Butazate*	lb.	.87	.92
Butyl Eight*	lb.	1.10	1.35
Butyl Namate	lb.	.45	.50
Butyl, Ethyl & Methyl Zimate Slurry (50% solids content)	lb.	.85	.89
Captax*	lb.	.44	.46
C-P-B*	lb.	1.95	2.00
Cumate, Rodform*	lb.	——	1.45
Cydac*	lb.	.76	.78
DIBS*	lb.	——	.85
Diorthotolyguanidine	lb.	.69	.70
Dipac*	lb.	——	.85
Diphenylguanidine	lb.	.49	.50
El-Sixty*	lb.	.62	.69
Ethazate*	lb.	——	1.04
50D*	lb.	.87	.92
Ethyl Thiurad*	lb.	——	1.04
Ethyl Tuex*	lb.	——	1.04
Ethylac*	lb.	.93	.95
Guantal*	lb.	.62	.69
Harvex*	lb.	.70	.76
Hepteen Base*	lb.	1.85	1.90
Kure-Blend MT*	lb.	——	.70
Ledate, Rodform*	lb.	——	1.04
MBT-XXX*	lb.	.55	.57
MBTS Pellets*	lb.	.54½	.56½
Merac*	lb.	.75	1.05
Mercaptobenzothiazol	lb.	.44	.46
Mercaptobenzothiazyl Disulfide	lb.	.54	.56
Mertax*	lb.	.55	.62
Methazate*	lb.	——	1.04
Monex*	lb.	——	1.14
Mono Thiurad*	lb.	——	1.14
Morfex*	lb.	.65	.67
2-MT	lb.	.88	.90
NA-22* (for neoprene)	lb.	——	1.05
NOBS No. 1*	lb.	.76	.78
Special*	lb.	.80	.82
O-X-A-F	lb.	.55	.57
Pennac SDB*	lb.	.45	.48
Pentex*	lb.	——	1.24
Flour*	lb.	——	.30
Permalux (Neoprene)*	lb.	——	2.25
Phenex*	lb.	.60	.65
Polyac*	lb.	——	1.85
R-2 Crystals*	lb.	——	4.35
Rotax*	lb.	.55	.57
RZ-50-A*	lb.	——	1.00
B*	lb.	——	1.00
Santocure*	lb.	.76	.83
NS*	lb.	.80	.87
Selenac* (Ethyl, Methyl)	lb.	——	4.25
Seleram, Ethyl	lb.	——	3.00
Setsit-5*	lb.	.75	1.05
9*	lb.	.85	1.13
SPDX-GH*	lb.	.77	.79
GL*	lb.	1.20	1.30
Tellurac*	lb.	——	1.45
Tepidone*	lb.	.45	.48
Tetrone A*	lb.	——	1.98
Thiate A*	lb.	.88	——
B*	lb.	1.05	1.25
Thiofide*	lb.	.54	.61
S*	lb.	.64	.71
Thionex*	lb.	——	1.14
Thiotax*	lb.	.44	.51
Thiram, Ethyl	lb.	——	1.04
Methyl	lb.	——	1.14
Thiurad*	lb.	——	1.14
Thiuram E*	lb.	——	1.04
M*	lb.	——	1.14
Trimene*	lb.	.56	.62
Base*	lb.	1.03	1.10
Tripbenyl Guanidine	lb.	——	.90
Tuads* (Ethyl)	lb.	——	1.04
Tuads* (Methyl)	lb.	——	1.14
Tuex*	lb.	——	1.14
Ultex*	lb.	1.15	1.20
Unads*	lb.	——	1.14
ZB*, ZE*, ZM*	lb.	——	.85
Vulcacure NB*	lb.	.45	.45
NS*	lb.	.75	1.05
TMD*	lb.	——	1.14
Z-B-X*	lb.	2.45	2.50
Zenite*	lb.	.54	.56
Zenite A*	lb.	.69	.71
Zenite Special*	lb.	.55	.57
Zetax* (uncoated)	lb.	.55	.57
Zimate* (Butyl)	lb.	.85	.89
Zimate* (Ethyl)	lb.	.85	.89
Zimate* (Methyl)	lb.	.85	.89
Ziram, Butyl	lb.	——	1.04
50% Dispersion	lb.	.85	.89
Ziram, Ethyl	lb.	——	1.04
50% Dispersion	lb.	.85	.89
Ziram, Methyl	lb.	——	1.04
50% Dispersion	lb.	.85	.89

ACTIVATORS

Blue Lead Sublimed (dlvd.)	lb.	.17¼	.18¼
Cottonseed Fatty Acids			
Drew Wecoline C*	lb.	.17¼	.19
Wochem 210*	lb.	.16¼	.19¼
211*	lb.	.16¼	.19¼
Fish Oil, Hydrogenated, Fatty Acid			
DAR-S* (dlvd.)	lb.	.13	.15½
DAR-HY* (dlvd.)	lb.	.15¾	.18½
Hydrofol Acids* (dlvd.)	lb.	.15	.25¼
Hyfac 430* (dlvd.)	lb.	.18	.20½
Neo-Fat H.F.O.* (dlvd.)	lb.	.14½	.15¾
Neutrex* (dlvd.)	lb.	.15¾	.18½
Stearite*	lb.	.11¾	.14¼
Talene* (dlvd.)	lb.	.16¾	.19¼
Lime, Hydrated			
Arrowhead*	ton	——	21.00
Marblehead*	ton	——	19.25
Sierra*	ton	——	22.50
Litharge			
Eagle-Picher* (c.l.)	lb.	.18	——
SB* (dlvd.)	lb.	——	.18½
Magnesium Oxide, Heavy			
General Magnesite 500*	lb.	.05½	.06
600*	lb.	.06½	.07
Kaiser 325*	lb.	.057	.073
Michigan No. 15*	lb.	.05½	.06½

ACTIVATORS (Cont'd)

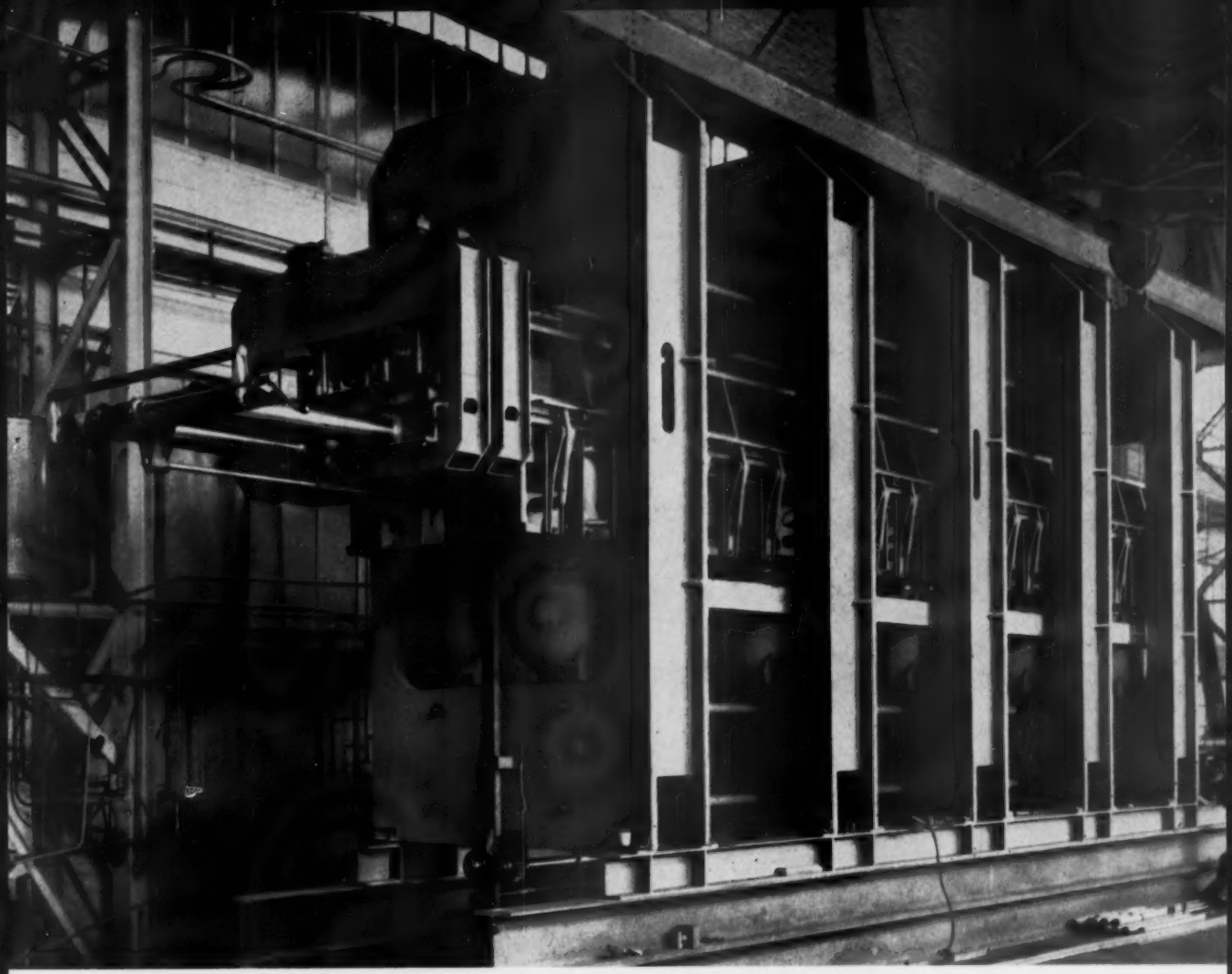
Magnesium Oxide, Light			
Carey Mag*	lb.	.25¼	.26
General Magnesite* (neoprene grade)	lb.	.26¾	.28¾
General Magnesite No. 101*	lb.	.23½	.24½
Genmeg MLW*	lb.	.23½	.24½
K & M* (neoprene grade)	lb.	.29¾	.30
Light Calcined Magnesia			
No. X-01*	lb.	.25¼	.26
Maglite D*	lb.	.23½	.26½
K*	lb.	.25¾	.27
L*	lb.	.29¾	.30¾
M*	lb.	.27	.28½
Marmag*	lb.	.24¾	.26
Michigan No. 30*	lb.	.25¾	.26
Neomag Powder*	lb.	.29¾	.30
Pellets*	lb.	.31¾	.32
Michigan No. 40*	lb.	.29¾	.30
Oleic Acid			
Dar-Chem* 105	lb.	.17¼	.19¾
Drew Wecoline OO*	lb.	.17¾	.19
Emersol 210* (dlvd.)	lb.	.17¼	.19¾
Groco Red Oil	lb.	.17¼	.19¾
Neo-Fat 92-04*	lb.	.20½	.22½
94-04*	lb.	.18½	.20½
Wochem 310, 311	lb.	.17	.19½
Palm Fatty Acids			
Groco 45*	lb.	.15¾	.18¼
Neo-Fat*	lb.	.15¾	.17¾
Wochem 280*	lb.	.15¾	.18¼
281*	lb.	.16¼	.18¾
Potassium Oleate (dms.)	lb.	.48	.73
Drew 24%*	lb.	.20	.73
Red Lead			
Eagle-Picher* (c.l.)	lb.	.19	——
No. 2 RM* (dlvd.)	lb.	——	.18½
Sodium Laurate, 75%*	lb.	.64	.89
Sodium Oleate, 75%*	lb.	.54	.79
Paste (dms.)	lb.	.39	.64
Sodium Stearate, 75%*	lb.	.47	.72
Stearic Acid, Single Pressed			
Emersol 110* (dlvd.)	lb.	.16¼	.18¾
Groco 53*	lb.	.16¼	.18¾
Neo-Fat 18-53*	lb.	.14¾	.16¾
Standard Pearlstearic* (dlvd.)	lb.	.16	.18½
Wochem 730*	lb.	.13	.15½
Stearic Acid, Double Pressed			
Choice Pearlstearic* (dlvd.)	lb.	.16	.18½
Emersol 120* (dlvd.)	lb.	.16¾	.19½
Groco 54*	lb.	.16¾	.19¼
Hydrofol Acid 444	lb.	.12¾	.14¾
Neo-Fat 18-54*	lb.	.15¼	.17¼
Wecoline 200*	lb.	.14¾	.16
1000*, 1500*	lb.	.12	.13¼
Wochem 731*	lb.	.15¾	.18¼
Stearic Acid, Other			
Extra Pearlstearic* (dlvd.)	lb.	.17¾	.20¼
Groco*	lb.	.12¾	.14¾
Neo-Fat 18*	lb.	.18½	.20½
18-58*	lb.	.14¼	.16¼
18-61*	lb.	.16¼	.18¼
Stearex* (dlvd.)	lb.	.11¾	.13
Stearite*	lb.	.11¼	.13¼
Wecoline 300*	lb.	.15¼	.16½
Wochem 720*	lb.	.11¾	.14¼
721*	lb.	.11¾	.14¼
732*	lb.	.16¾	.19¼
White Lead Basic Carbonate	lb.	.19	.20
White Lead Basic Sulfate	lb.	.17¼	.18¼
Zinc Laurate			
Laurex*	lb.	.33	.34
Zinc Stearate	lb.	.41	.46
Aquazinc K.C.*	lb.	.30	.55
Crown Brand*	lb.	.39	.44

Unclassified Activators

Actifat* (dms.)	lb.	——	.18
Aktone*	lb.	.21¼	.23¼
Barak*	lb.	——	.65
Curade*	lb.	.57	.59
Dibenzo G-M-F	lb.	——	2.60
D-B-A*	lb.	——	1.95
G-M-F*	lb.	——	2.60
Dibutylamine (dlvd.)	lb.	.55½	.56½
MODX*	lb.	.38	.40
Neo Fat 42-07*	lb.	.10¾	.12¼
Ridacto* (dms.)	lb.	.25	.26
Snodotte* (dlvd.)	lb.	.20¾	.22¾
Vimbra	lb.	.32	.38½
Vulklor*	lb.	.88	.98

ANTI-COAGULANTS

Aqua Ammonia* (dms.)	lb.	.031	.035
M.B.M.C.* (l.c.l.)	lb.	.54	.76



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ANTI-FOAMING AGENTS

Aero Anti Foam H*	lb.	—	.20
Regular*	lb.	—	.12
Anhydrol 6991*	lb.	.51	.56
D.C. Antifoam A*	lb.	5.45	6.65
Antifoam A Emulsion*	lb.	2.05	2.85
Antifoam AF Emulsion*	lb.	2.05	2.85
Antifoam B*	lb.	.68	1.20
Defoama W-1701*	lb.	—	.12½
Defoamer A-25*	lb.	—	3.00
Defoamer 630*	lb.	—	.14
Deltyl Prime	lb.	.70	.80
Foam-Nix*	lb.	.50	1.25
G-E Antifoam SS-24*; 66*	lb.	5.28	6.65
60 Emulsion*	lb.	2.05	3.75
Igepol CO-210	lb.	—	.36
Kessco X-3* (dms.)	lb.	—	.39
X-180*	lb.	—	.28
X-181*	lb.	—	.36½
Nopco 1407*	lb.	.19½	.21½
1497-V*	lb.	.14¼	.16¼
1907-B*	lb.	.22½	.24½
JMK*	lb.	.48½	.50½
JMU*	lb.	.23¼	.25¼
JMY*	lb.	.21	.23
Pluronic L61*	lb.	.33½	.39
RS-968*	lb.	.38	.38½
Terpinol Prime No. 1	lb.	.35	.50
Tributyl Phosphate (dms.)	lb.	.52½	.53½
UC SAG 47*	lb.	5.25	6.50
470*	lb.	.69	1.20
VL-520*	lb.	2.68	3.50

ANTIOXIDANTS

Agebest 1293-22A*	lb.	1.90	2.00
AgeRite Alba*	lb.	2.40	2.50
Gel*	lb.	.70	.72
Hipar*	lb.	1.05	1.07
H.P.*	lb.	.79	.81
Powder*	lb.	.57	.59
Resin*	lb.	.88	.90
Resin D*	lb.	.57	.59
Spar*	lb.	.57	.59
Stalite & Stalite S*	lb.	.57	.59
Superlite*	lb.	.57	.59
White*	lb.	1.50	1.60
Akroflex C*	lb.	.85	.87
CD*	lb.	.79	.81
Alcogard 354*	lb.	1.40	1.52
Aminox*	lb.	.57	.62
Antioxidant 425*	lb.	2.47	2.50
Antioxidant 2246*	lb.	1.50	1.53
Antox*	lb.	.59	.61
Aranox*	lb.	3.25	3.30
Benzoquinone	lb.	1.50	1.75
Betanox Special*	lb.	.91	.96
B-L-E*	lb.	.57	.62
B-X-A*	lb.	.55	.57
Catalin CAO No. 1*	lb.	.91	.95
CAO No. 3*	lb.	1.05	1.07
CAO No. 5*	lb.	1.49	1.50
CAO No. 6*	lb.	—	3.20
Deenax*	lb.	.95	1.05
Di-tert-Butyl-para-Cresol	lb.	.86	1.16
Eugenol C-95%*	lb.	2.30	2.50
Flectol H*	lb.	.57	.64
Flexamine*	lb.	.79	.84
Ionol* (dms.)	lb.	.91	.95
Neozone A*	lb.	.64	.66
C*	lb.	.86	.88
D*	lb.	.57	.59
Nevastain A*	lb.	.51	.61
B*	lb.	.51	.70
Nullapon BF-12*	lb.	—	.21½
BF-13*	lb.	—	.25½
BF-78*	lb.	—	.55
BF-Acid*	lb.	—	.85
Octamine*	lb.	.57	.62
Oxidex*	lb.	—	3.60
PDA-10*	lb.	.46	.48
Permalux*	lb.	—	2.25
Polygard*	lb.	.52	.62
Santoflex AW*	lb.	.71	.78
DD*	lb.	.57	.64
75*	lb.	1.01	1.08
Santovar-A*	lb.	1.55	1.62
Santowhite Crystals*	lb.	1.55	1.62
Santowhite L*	lb.	.57	.64
MK*	lb.	1.25	1.32
Powder*	lb.	1.55	1.62
Sequestrene AA*	lb.	.70	.80
NA2*	lb.	.59	.66
NA3*	lb.	.58	.65
Stabilite*	lb.	.57	.59
Alba*	lb.	.75	.80
FLX*	lb.	.78	.80
L*	lb.	.65	.67
White*	lb.	.57	.59
White Powder*	lb.	.46	.48
Stabilizer No. 1*	lb.	1.55	1.80
Stabilizer No. 9-A*	lb.	.80	1.05
Styphen I*	lb.	.51	.55
Sunolite*	lb.	.16	.22
Tecquinol*	lb.	.82½	.84½
Tannic Acid, Tech.	lb.	.46	.48
Tenamene 3*	lb.	.91	.95
Thermoflex A*	lb.	1.05	1.07
V-G-B*	lb.	.75	.77
Wing-Stay S*	lb.	.53	.57

ANTIOZONANTS

Eastozone* 30, 31	lb.	1.05	1.07
Fura-Tone NC-1008*	lb.	.28	.39
NC-1012*	lb.	.46	.69
Santoflex AW*	lb.	.79	.86
UOP 88* & 288* (dms)	lb.	1.05	1.07

ANTI-SCORCHING AGENTS

Armeen HT*	lb.	.34	.40
Good-rite Vultrol*	lb.	.67	.70
Harcopol 1183*	lb.	.70	.74
Retarder PD*	lb.	.37	.39
W*	lb.	—	.46
Sodium Acetate 60-62% Crystals	lb.	.08	.08½

ANTISEPTICS AND GERMICIDES

A.P.C. 6901*	lb.	.32	.38
Arquad S*	lb.	.38	.44
Formaldehyde (dms.)	lb.	.06	.076
G-4* (bbls.)	lb.	1.09	1.29
G-11*	lb.	1.98	2.08
Halane*	lb.	.40	.47
Ortho Cresol (26°—27°)	lb.	.14	.16¾
Preventol GD	lb.	—	1.09
Retarder D*	lb.	.42	.50
Vancide	lb.	—	.80

ANTI-WEBBING AGENTS (for Latex)

DC 7 Compound*	lb.	5.05	6.50
Webnix 34-L*	lb.	1.25	1.75
57*	lb.	1.50	2.00
69-C*	lb.	1.50	2.00
71*	lb.	1.25	1.75

AROMATICS (DEODORANTS)

Airkem 115*	gal.	—	6.50
122*	gal.	—	6.50
186*	gal.	—	6.50
Alamask AA*	lb.	—	3.00
AF*	lb.	—	2.50
AO*	lb.	—	1.50
AR*	lb.	—	.50
BG*	lb.	—	1.15
BGM*	lb.	—	.60
CY*	lb.	—	2.40
DI*	lb.	—	3.35
DL*	lb.	—	1.95
H*	lb.	—	5.50
LD*	lb.	—	.75
ND*	lb.	—	2.75
O*	lb.	—	6.50
OS*	lb.	—	5.25
Bouquet 149*	lb.	—	3.00
Coumarin*	lb.	—	3.70
Curodex 19*	lb.	4.75	4.90
188*	lb.	5.75	5.90
198*	lb.	6.75	6.90
Deodorant 65*	lb.	—	1.85
Deodorant L-37*	lb.	2.15	2.25
L-44*	lb.	2.65	2.75
N.L.T.X.*	lb.	1.90	2.00
Deodorant Oil GD 6422*	lb.	1.90	2.20
GD 6423*	lb.	1.60	1.90
GD 6575*	lb.	2.40	2.90
GD 31063*	lb.	2.25	2.75
Ethavan*	lb.	6.20	6.25
Latex Perfume 17326	lb.	—	4.00
18301	lb.	—	3.00
22258	lb.	—	2.50
Naugaromes* (dms.)	lb.	.60	3.00
Neutroleum Delta*	lb.	—	2.25
Gamma*	lb.	—	3.25
Parador A*	lb.	1.80	2.10
C*	lb.	2.00	2.50
E*	lb.	.25	.40
GD 5280*	lb.	2.00	2.50
GD 53481*	lb.	1.70	2.00
Perfume Oil Bouquet Vanilla M*	lb.	1.60	1.70
Rodo No. 0*	lb.	4.00	4.50
No. 10*	lb.	5.00	5.50
Rubbaromes* (dms.)	lb.	.60	3.80
Rubber Perfume 12*	lb.	—	4.35
Russian Leather 7*	lb.	—	4.35
Vanillin	lb.	2.75	2.80

BLOWING AGENTS

Ammonium Bicarbonate	cwt.	—	8.00
Better Blend Soda* (c.l., bags)	cwt.	—	2.55
Blowing Agent No. 81105	lb.	.32	.35
Celogen*	lb.	—	1.95
AZ*	lb.	—	1.95
Diazo Amino Benzene	lb.	—	.73
Kempore R-125	lb.	—	1.92
Neo Fat 42-12*	lb.	.10¼	.12¼
Opex 40	lb.	.68	.72
Sodium Bicarbonate, U.S.P. (c.l., bags)	cwt.	—	2.40
Unicel ND*	lb.	—	.72
S*	lb.	—	.20
Urea	lb.	.06	.07

BONDING AGENTS

Base 6986*	lb.	.27	.32
Braze*	gal.	6.00	9.00
Chemlok 201, 203, 220, 401, 607	gal.	5.00	24.00
614	lb.	4.35	4.75
Cover Cement*	gal.	2.50	4.00
Durez 12987*	lb.	.47½	.51¼
Gen-Tac Latex*	lb.	.70	.75
Hylene M*	lb.	1.70	2.00
M-50*	lb.	1.00	1.25
Penacolite B1A*	lb.	—	.95
R-2710*	lb.	—	.95
Plicbond 20*	gal.	2.91	4.23
30*	gal.	3.65	4.97

BONDING AGENTS (Cont'd)

Rex Compounds*	gal.	1.30	1.90
Thixons*	gal.	3.30	9.00
Ty-Ply Q (BN & S)*	gal.	6.75	8.00
Tygobond 30*	gal.	4.10	5.40
40*	gal.	5.80	6.89
41*	gal.	8.65	9.85
45*	gal.	5.75	6.48
Vinculux	gal.	—	4.95

COAGULANTS

Acetic Acid—56% (bbls.)	cwt.	9.00	11.00
Glacial 99½% (dms.)	lb.	.12	.13
Calcium Nitrate, Tech. Flake	lb.	.07½	.09½
Hydroxyacetic Acid—70% (dms.)	lb.	—	.09½
Zinc Nitrate, Tech. Flake	lb.	—	.20

COLORING AGENTS

Black

Aquablak B*	lb.	.09¾	.10¾
M*	lb.	.10½	.11
S*	lb.	.11¾	.12¼
Black Shield 4*	lb.	.09	.09½
No. 5	lb.	.10	.10½
No. 6	lb.	.09	.09½
No. 19	lb.	.11	.11½
L-1404B	lb.	.10½	.11
Carbon Black—See *Reinforcing Agents*			
Cooke 1026*	lb.	—	2.50
Lampblack No. 10*	lb.	.06	.09
Mapico Black Iron Oxide* (50 lb. bags)	lb.	.14¼	.15
Pure Black Iron Oxide	lb.	.14¼	.14½

Blue

Akron Masterbatches*	lb.	2.23	2.78
Toners*	lb.	2.30	6.35
Blue Powders	lb.	2.20	3.75
Cooke M.B. Blue*	lb.	2.20	3.75
Disco Blues	lb.	2.20	3.45
Monastral Rubber Blue CPL*	lb.	1.95	1.95
PCD, Dispersed*	lb.	—	2.55
Peacoline Blue*	lb.	—	3.85
Ramapo Blue*	lb.	2.75	3.00
Rubber Blue GD* (Disp.)	lb.	—	4.75
Rubber Blue X-1999*	lb.	—	1.90
Rubber Dispersed Blues	lb.	2.52	2.78
Solfast Blue*	lb.	.75	3.60
Stan-Tone MBS*	lb.	2.20	2.85
GPE*	lb.	—	1.50
PEC*	lb.	.93	1.08
Ultramarine	lb.	.14	.30
Vansul Blue M.B.*	lb.	1.00	2.60

Brown

Brown Iron Oxide	lb.	.15¼	.15½
Mapico Brown* (50 lb. bags)	lb.	.15¾	.16
Stan-Tone GPE*	lb.	—	3.00
Vansul Brown M.B.* (Organic)	lb.	—	2.30

Green

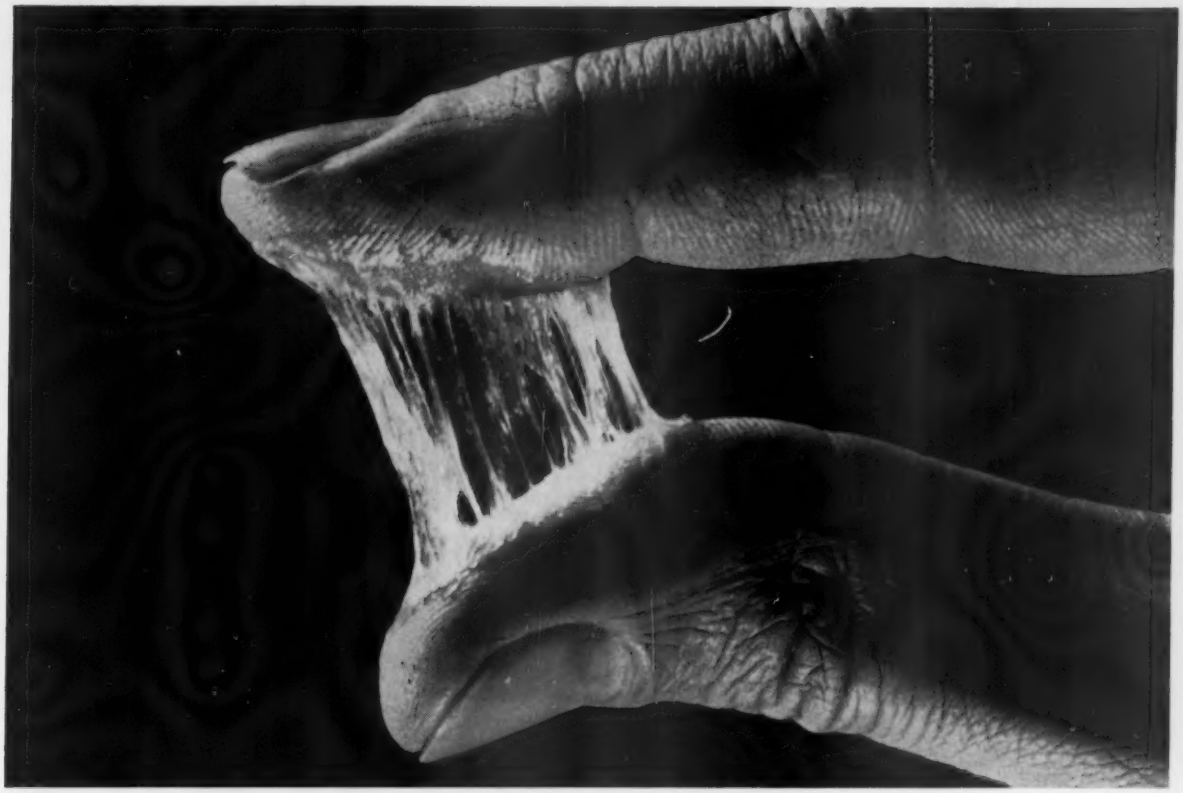
Akron Masterbatches*	lb.	1.38	3.08
Toners*	lb.	1.35	4.95
Cooke M.B. Green*	lb.	1.60	2.80
1013*	lb.	—	2.80
Disco Greens	lb.	1.55	2.80
Green Powders	lb.	1.35	3.95
Monastral Rubber Green GSD* (Dispersed)	lb.	—	2.80
GSL*	lb.	2.20	2.20
Permansa Green CP-1236*	lb.	—	1.35
Pigment Green B*	lb.	1.45	1.45
GL-652D*	lb.	.90	.95
Ramapo Green*	lb.	—	3.50
Rubber Dispersed Greens	lb.	1.23	3.08
Rubber Green FD* (Disp.)	lb.	—	2.05
Rubber Green X-1292*	lb.	—	1.75
Solfast Green*	lb.	—	3.95
Stan-Tone MBS*	lb.	1.55	3.35
GPE*	lb.	—	3.00
PC*	lb.	2.20	2.25
Vansul Green M.B.*	lb.	1.50	3.00

Maroon

Akron Masterbatches*	lb.	—	4.10
Toners*	lb.	2.00	4.00
Pyrolux Maroon*	lb.	—	3.40
Vansul Maroon M.B.*	lb.	—	3.35

Orange

Akron Masterbatches*	lb.	2.42	2.77
Toners*	lb.	2.82	4.00
Benzidene Orange	lb.	—	3.30
Cooke MB*	lb.	2.25	2.35
1021*	lb.	—	2.25
Dianisidine Orange*	lb.	—	2.85
Disco Oranges	lb.	2.30	2.85
Mercadium X-2667*	lb.	—	1.61
Molybdate Orange	lb.	—	.48
Oswego Orange X2065*	lb.	—	3.15
Rubber Orange OD* (Disp.)	lb.	—	2.25
Stan-Tone Cadmium Dry*	lb.	1.85	4.23
Cadmium Paste*	lb.	2.48	2.80
GPE*	lb.	1.20	4.35
PC*	lb.	.75	.80
Vansul Orange M.B.*	lb.	2.40	2.45



Now—give neoprene cement a tighter grip, longer tack, more heat resistance.

Add a pinch of permanence—Durez 19428

Some interesting things happen to neoprene solvent cement when you add *Durez 19428*, new heat-reactive phenolic resin produced by the same research and development that made the familiar *Durez 12603* so generally accepted.

In a typical cement formulation, *Durez 19428* added to neoprene steps up adhesion to synthetic fibers such as Dacron, nylon, and rayon—and provides a tighter grip to glass, metals, and unplasticized plastic films, as well.

Add *Durez 19428* resin and a small amount of magnesium oxide, and the uncured cement bond becomes more resistant to heat. Its heat resistance grows as you add more resin. The bond becomes even more heat resistant if cured at 200° F.

Longer tack retention, better fabric life

In a cement formulated for good initial tack and tack retention, adding *19428* prolongs the tack retention period. The resin also minimizes the tendency of bonded fabrics, such as cotton and rayon, to deteriorate in sunlight. As little as 10 parts of *19428* per 100 of neoprene can retard the tendency of many cements to change viscosity when stored.

You'll find this new resin has good compatibility with all types of neoprene. It has infinite solubility in toluene, VM&P naphtha, methyl ethyl ketone, acetone, and carbon tetrachloride, and is soluble up to 12.5% resin solids in mineral spirits.

The resin is stable and stores well in cool, dry conditions. It comes to you in crushed form, in standard 51-gallon fiber drums containing 325 lbs. net.

To see what *Durez 19428* can do for your cement formulations, use the coupon now to request a sample. Ask also for Service Bulletin 305, which describes the recommended compounding and mixing methods.

What can this new resin do for your neoprene cement? To find out quickly, check here. We'll send you:

☐ Evaluation sample of *Durez 19428* ☐ Technical data sheet
☐ Service Bulletin 305—compounding and mixing suggestions

Clip, attach to your business letterhead, with your name, title, company address, and mail to us today.

DUREZ® HOOKER CHEMICAL PLASTICS

PLASTICS DIVISION
HOOKER CHEMICAL CORPORATION
102 Walck Road, North Tonawanda, N. Y.

COLORING AGENTS (Cont'd)

Red

Akron Masterbatches*	lb.	1.00	3.53
Toners*	lb.	.88	5.60
Arcturus Reds*	lb.	—	1.35
Antimony Trisulfide	lb.	.72	.78
R.M.P. Sulfur Free*	lb.	—	.78
R.M.P. No. 3*	lb.	—	.72
Brilliant Toning Reds*	lb.	1.65	1.90
Cadmolith Red* (dms.)	lb.	1.94	2.87
Cooke M.B. Red*	lb.	1.05	3.25
1010*	lb.	—	1.75
Disco Reds	lb.	1.05	3.25
Graphic Red* (dlvd.)	lb.	.98	1.03
Kroma Reds*	lb.	.14	.15
Lake Red C*	lb.	—	1.25
Mapico Reds* (50 lb. bags)	lb.	.14¼	.14½
Mercadium X-2668 Light*	lb.	—	1.68
X-2669 Medium Light*	lb.	—	1.76
X-2670 Medium*	lb.	—	1.83
X-2671 Dark*	lb.	—	1.91
Oximony Red Iron Oxide	lb.	.12¼	.13
Polaris Red*	lb.	—	1.70
Recco Red Oxide*	lb.	.12	.13
Red Iron Oxide, Light	lb.	.13¼	.14
Red Powders	lb.	—	4.40
Rubber Dispersed Reds	lb.	1.47	3.58
Rubber Red PBD* (Disp.)	lb.	—	2.05
2BD, Dispersed*	lb.	—	2.00
2BL*	lb.	1.24	1.24
PBL*	lb.	1.24	1.24
Rubanox Reds*	lb.	1.47	1.60
Rubber Red CP-339* (dlvd.)	lb.	—	1.10
Rubber Red X-1148*	lb.	—	.93
Solfast Red*	lb.	1.47	1.80
Stan-Tone MBS*	lb.	1.00	3.75
GPE*	lb.	.77	3.15
PC*	lb.	1.30	2.50
PDS*	lb.	1.40	1.55
PVC*	lb.	1.65	1.90
Vansul Red M.B.*	lb.	1.05	3.35
Watchung Red*	lb.	1.90	1.90

Tan

Mapico Tan 15* (50 lb. bags)	lb.	.23¼	.23½
20* (50 lb. bags)	lb.	.23¼	.23½

White—Lithopone

Eagle-Picher*	lb.	.0800	.0975
Permolith*	lb.	.0837½	.0912½
Sunolith*	lb.	.0800	.0875

White—Titanium Pigments

Iceberg*	lb.	—	.02½
Icecap K*	lb.	—	.03¼
Horse Head Anatase Grades*	lb.	.25½	.26½
Rutile Grades*	lb.	.27½	.28½
Stan-Tone PC*	lb.	.55	.60
Ti-Cal*	lb.	.09	.09¾
R-22*, R-25*, R-27*, R-30*	lb.	.09¾	.09¾
R-60*	lb.	.09¾	.10¼
Ti-Pure*	lb.	.24½	.27½
Anatase Grades*	lb.	.25½	.26½
R-100*, R-500*	lb.	.27½	.28½
Titanox A*—all grades (dlvd.)	lb.	.25½	.26½
C-50* (dlvd.)	lb.	.14½	.14⅞
RA* (dlvd.)	lb.	.27½	.28½
RA-10* (dlvd.)	lb.	.27½	.28½
RA-NC* (dlvd.)	lb.	.27½	.28½
RC* (dlvd.)	lb.	.09¾	.10⅛
RC-HT* (dlvd.)	lb.	.09¾	.09⅞
Unitane O-110*	lb.	.25½	.26½
O-220*	lb.	.25½	.26½
O-310*	lb.	.25½	.26½
O-410*	lb.	.25½	.26½
OR-150*	lb.	.27½	.28½
OR-250*	lb.	.27½	.28½
OR-340*	lb.	.27½	.28½
OR-342*	lb.	.27½	.28½
OR-350*	lb.	.27½	.28½
OR-540*	lb.	.27½	.28½
OR-640*	lb.	.27½	.28½
Zopaque*	lb.	.24½	.25½
R*	lb.	.26½	.27½

White—Zinc Oxide (American Process)

AZODOX 44, 45	lb.	.1450	.1550
AZO-ZZZ 11*, 22*, 33*, 44*, 55*	lb.	.1450	.1550
Eagle-Picher AAA*	lb.	.1450	.1550
Horse Head Special*	lb.	.1450	.1550
XX*	lb.	.1450	.1550
Protox 166*	lb.	.1450	.1550
167*	lb.	.1450	.1550
267* (pelleted)	lb.	.1450	.1550
St. Joe Black Label*	lb.	.1450	.1550
Green Label*	lb.	.1450	.1550
Red Label*	lb.	.1450	.1550
Pelleted	lb.	.1450	.1550

COLORING AGENTS (Cont'd)

White—Zinc Oxide (Dispersed)

Dispersed Zinc Oxide	lb.	—	.13

White—Zinc Oxide (French Process)

AZO-ZZZ 66	lb.	.1450	.1550
Florence Green Seal*	lb.	.1625	.1725
Red Seal*	lb.	.1575	.1675
White Seal*	lb.	.1675	.1775
Kadox 25*	lb.	.1675	.1775
15*, 17*, 72* & 515	lb.	.1450	.1550
Protox 168*	lb.	.1450	.1550
169*	lb.	.1450	.1550
268* (pelleted)	lb.	.1450	.1550
U.S.P. (cartons)	lb.	.1775	.1875
XX-78*	lb.	.1450	.1550

White—Zinc Sulfide

Cryptone ZS*	lb.	.2530	.2630
Lehigh 35%*	lb.	.15125	.16125
50%	lb.	.15375	.16375

Yellow

Akron Masterbatch*	lb.	1.12	2.18
Toners*	lb.	2.10	6.00
Benzidene-Lightfast	lb.	3.40	5.35
Benzidine Yellow	lb.	1.41	2.55
Cadmolith Yellow (dms.)	lb.	1.12	1.20
Chrome Yellow	lb.	.35	.35
Cooke M.B. Yellow 405*	lb.	2.15	2.75
105*	lb.	—	2.15
Disco Yellows	lb.	2.05	3.95
Iron Oxide, Pure Light Shades	lb.	.12	.12¼
Dark Shades	lb.	.11½	.11¾
Mapico Yellow* (50 lb. bags)	lb.	.12	.12¼
Rubber Dispersed Yellows	lb.	1.27	2.13
Rubber Yellow GD* (disp.)	lb.	—	2.25
GL*	lb.	—	1.68
Rubber Yellow X-1940*	lb.	—	2.35
Stan-Tone Cadmium Dry*	lb.	2.80	2.98
Cadmium Paste	lb.	1.77	1.79
MBS*	lb.	1.30	2.20
GPE*	lb.	.77	3.25
PC*	lb.	.55	3.40
Toluidine Yellow	lb.	2.20	2.20
YL-660 D*	lb.	1.25	1.35
Oximony Iron Oxide	lb.	.12¾	.13
Vansul Yellow M.B.*	lb.	1.15	2.15
Yellow Powders	lb.	2.00	5.00
Zinc Yellow	lb.	.29	.29

DISPERSING AGENTS

Ancheid*(†)	lb.	.24	.25
Anhydrapent*	lb.	.56	.59
Armeen 18*	lb.	.39	.45
Belloid TD*	lb.	.15¾	.16¼
Blancol*	lb.	—	.15¾
Darvan No. 1*, No. 2*, No. 3*	lb.	.22	.30
Daxad 11* (21*, 23*)	lb.	.08	.30
Diethanolamine (dms., dlvd.)	lb.	.24½	.27
Dispersaid*	lb.	1.25	1.35
Emcol K-8300* (dms.)	lb.	.14	.18
P10-59	lb.	.32	—
5120	lb.	.31	—
5138	lb.	.31	—
Emulphor ON-870*	lb.	—	.55
Furala*	lb.	.06½	.07½
Halloid*	lb.	.04½	.05½
Igepal CO-630*	lb.	—	.29
Igepon T-73*	lb.	—	.29½
Kyro EO* (dms.)	lb.	—	.29¾
Leonil SA*	lb.	—	.55
Lipal No. 9-N*	lb.	.28	.29
11-O*	lb.	.28	.29
Lomar PW*	lb.	.15¼	.15¾
Marasperse C*	lb.	.06¼	.06¾
CB*	lb.	.13	.15
N*	lb.	.09½	.10½
Monoethanolamine (dms., dlvd.)	lb.	.25	.27½
Naccotan A*	lb.	.16½	.17
Nekal BA-75*	lb.	—	.40
BX-78*	lb.	—	.64
Nopco 1187-X*	lb.	.15	.16
Pluronic F68*	lb.	.38½	.44
Polyfon*	lb.	.08	.10
R & R 551*	lb.	—	.28
Rubbex*	lb.	.247	.277
Stablex B*	lb.	.50	.95
Stan-Chem BQC*	lb.	.12¼	.17¼
1067*	lb.	—	.13½
1471*	lb.	.1687	.2187
2251*	lb.	.12¼	.17¼
Trenamine D-25*	lb.	.32½	.36
Triethanolamine (dms., dlvd.)	lb.	.22	.25½
Yelkin TT* (and TTS*)	lb.	.13	.16

EXTENDERS

Areco 1071-13B*	lb.	.14½	.15½
1073-18B*	lb.	.13½	.14½
1294-36B*	lb.	.11½	.12½
Car-Bel-Ex-A* (and B*)	lb.	—	.14
Extender 600*	lb.	—	.1870
Facile Gum 4A*	lb.	.48	.50
Millex*	lb.	—	.07
W*	lb.	—	.07

EXTENDERS (Cont'd)

Nopco 2271*	lb.	.16¾	.18¾
Polyco 418*	lb.	.17	.18
PR-162 Latex Extender*	lb.	—	.182
Solvitose HDF*	lb.	.22	.25
Synprolac*	lb.	.16	.23
Synprowax*	lb.	—	.23
Vistanex MM Grades*	lb.	—	.35

FILLERS (Inert and Reinforcing)

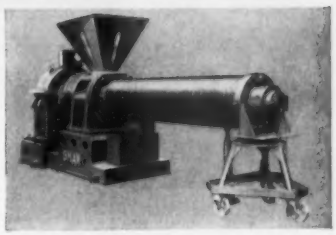
Abrasives			
Carbonite*	lb.	.21½	1.35
Lionite*	lb.	.16	1.27
Pumice	lb.	.03	.05
Walnut Shell Grits	ton	60.00	110.00
Aluminum Hydrate	lb.	.031	.170
Kaiser Alumina*	lb.	.026	.059
Aluminum Silicate			
AFD*	ton	29.50	36.00
Aluminum Flake*	ton	29.50	36.00
Marter White*	ton	18.50	30.00
Barium Carbonate (l.c.l.)	ton	109.00	126.50
Barytes			
No. 1 Floated, White*	ton	55.00	79.85
No. 2 Floated, Unbleached*	ton	50.00	74.85
No. 22 Barytes* (c.l.)	ton	—	30.00
No. 3805 Barytes*	ton	22.00	26.75
Foam A*	ton	—	55.00
Sparmite*	ton	80.00	90.00
X10R*	ton	80.00	90.00
Bentonite (c.l.)	ton	—	13.50
Argosite Clay* (c.l.)	ton	—	12.50
Bennett Clay* (c.l.)	ton	—	32.50
SPV Volclay* (c.l.)	ton	—	13.50
White Hi-Gel*	ton	—	65.90
Blanc Fixe	ton	125.00	142.00
Calcium Carbonate			
Atomite* (c.l.)	ton	—	32.50
B.I. White No. 1 (c.l.	ton	—	10.00
Calcene NC*	ton	80.00	100.00
TM*	ton	82.50	102.50
Calwhite*	ton	—	20.00
Camel-Carb*	ton	—	14.00
Camel-Tex*	ton	—	22.00
Camel-Wite*	ton	—	35.00
CCO White*	ton	—	22.00
Duramite*	ton	—	20.00
Gamaco* (c.l.)	ton	—	32.50
Georgia Marble 5-25* (c.l.)	ton	—	20.00
No. 10 White* (c.l.)	ton	—	11.00
Kalite*	ton	52.50	67.50
Laminar*	ton	—	30.00
Lesamite* (c.l.)	ton	—	27.50
Lorite*	ton	30.00	36.00
Millical*	ton	38.00	53.00
Multifex MM*	ton	117.50	137.50
Non-Fer-Al*	ton	35.00	50.00
Purecal M*	ton	56.75	80.75
SC* (and T*)	ton	110.00	125.00
U*	ton	120.00	135.00
PPTD* (c.l.)	ton	—	30.00
Rambo No. 1*	ton	—	11.50
Snowflake*	ton	—	20.00
Super Multifex*	ton	167.50	187.50
Surfex*	ton	42.00	57.00
Suspenso*	ton	38.00	43.00
Witcarb Reg.*	ton	60.00	85.00
*	ton	117.50	140.00
R*	ton	127.50	150.00
RC*	ton	117.50	140.00
York White*	ton	—	11.50
Calcium Silicate			
Silene EF*	lb.	.055	.065
Calcium Sulfate, Anhydrous			
Snow White Filler*	ton	—	22.00
Calcium Sulfate Hydrous			
Terra Alba No. 1*	ton	—	17.00
Chalk Whiting (l.c.l.)	lb.	.01½	.01¾
Recco Paris Whiting*	ton	—	35.00
OMYA Whiting*	ton	—	30.00
Clay			
Afton Clay*	ton	13.00	38.00
Aiken Clay*	ton	14.50	—
Alsilite* (c.l.)	ton	30.00	45.00
Aluminum Flake*	ton	25.50	28.50
Buca* (c.l.)	ton	—	45.00
Burgess No. 20*	ton	—	35.00
No. 30*	ton	—	37.00
Burgess Iceberg*	ton	—	50.00
Icecap K*	ton	—	65.00
Catalpo* (c.l.)	ton	—	35.00
Champion*	ton	—	14.50
Crown*	ton	—	14.00
Dixie* (c.l.)	ton	—	14.50
Franklin Clay—R* (c.l.)	ton	16.00	41.50
G. K. Soft*	ton	11.00	28.00
Harwick Clays*	ton	21.50	77.00
Hi-White R*	ton	14.50	—
Kaolloid Clay* (c.l.)	ton	—	10.50
LGB*	ton	17.50	22.50
LGP*	ton	20.00	25.00
McNamee* (c.l.)	ton	—	14.50
Natka 1200	ton	13.00	35.00
Par* (c.l.)	ton	—	13.00
Paragon*	ton	14.50	19.50
Pigment 5*	ton	27.50	34.50
33*	ton	—	37.00
Recco* (c.l.)	ton	—	14.50
Swanee Clay*	ton	—	12.50
Snobrite*	ton	—	12.50
Suprex*	ton	14.50	19.50
Whitetex* (c.l.)	ton	—	50.00
Windsor*	ton	14.50	39.50
4200 Clay*	ton	13.00	—

FRANCIS SHAW

quality engineering puts efficiency into Shaw machines

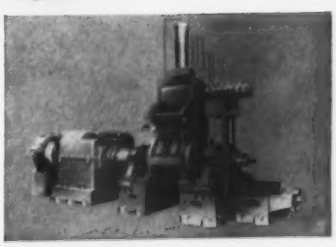
The cost-cutting performance of every Francis Shaw machine and its thorough dependability are the result of long experience and unvarying high standards of engineering in every detail of manufacture.

Close-limit accuracy and rigorous inspection during manufacture guarantee to the user a consistently high quality output from Francis Shaw equipment.



PLASTIC EXTRUDER. Fine temperature control is a vital feature of Francis Shaw extruders. All electric heating in separate zones is provided, each zone being separately controlled by proportioning instruments. A wide range of screw and die designs is available for the production of piping, sheeting, sections and the sheathing and insulation of cables. Extruder sizes from 1" to 12".

CALENDER. A comprehensive range of Francis Shaw Calenders is available for the processing of all rubber and plastic materials. Flood Lubrication and hydraulic roll balancing available on all production sizes. Roll Bending can be fitted as an additional refinement. All sizes available from 13" x 6" to 92" x 32". Two-, Three- and Four-Bowl Designs.



INTERMIX. A robust, high efficiency Heavy Duty Internal Mixer for mixing plastic compounds at lower-than-normal temperatures. It is supplied with steam heating for plastics and other materials, and the exclusive rotor design ensures consistent high quality mixing.

FRANCIS SHAW

QUALITY ENGINEERING FOR QUANTITY PRODUCTION

Francis Shaw are available for the design, manufacture, and installation of a wide range of processing equipment

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TELEPHONE NELSON 4-2350 TELEGRAMS CALENDER BURLINGTON ONTARIO

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FILLERS (Cont'd)

Diatomaceous Earth	ton	30.00	- 50.00
Celite 270	ton	55.00	-121.00
292	ton	36.00	- 95.00
Kaylorite* (c.l.)	ton	——	- 30.00
Lorite*	ton	——	- 36.00
Flock			
Cotton (White)	lb.	.26	- .28
Colored	lb.	.12	- .26
Filfloc F 40-9000*	lb.	——	- .13
F 6000*	lb.	——	- .36
Polycel*	ton	110.00	-210.00
Rayon, Bleached or Dyed	lb.	.75	- 1.20
Rayon, Grey	lb.	——	- .18
Rayon, Pink	lb.	——	- .20
Solka-Floc* (l.c.l.)	lb.	.07	- .16
Glue, Amber	lb.	.17	- .19
Ground Softwood Bark			
Silvacon* (c.l.)	ton	55.00	-100.00
Leather			
Flour (dust)	lb.	.12	- .15
Shredded	lb.	.05	- .17
Lignin	lb.	.06	- .08
Indulin*	lb.	.06	- .08
Limestone, Pulverized	ton	3.00	- 5.00
Asbestol Regular*	ton	27.00	- 29.00
Asbestol Superfine*	ton	32.00	- 34.00
Georgia Marble No. 10*	ton	——	- 11.00
Industrial Filler No. 100*	ton	——	- 7.75
Micro Velva A*	ton	49.00	- 51.00
L*	ton	57.00	- 59.00
No. 1 White*	ton	——	- 11.00
Magnesium Carbonate	lb.	.10½	- .13
K & M Clearcarb*	lb.	——	- .14
Technical* (c.l., eqld.)	lb.	.10½	- .12
Marinco CL*	lb.	.11	- .13
Magnesium Silicate (see Talc)			
Mica	lb.	.01¼	- .07½
Concord*	lb.	.08	- .08⅜
Micro-Mica*	lb.	.08	- .08¾
Mineralite* (c.l.)	ton	40.00	- 85.00
Silversheen*	lb.	.08	- .08¾
Triple A Mica* (c.l.)	ton	——	- 35.00
Vermiculite*	lb.	——	- .11
Wet Ground Biotite Mica	lb.	.06½	- .07¼
Wet Ground Mica No. 160*	lb.	.08	- .08¾
Pecan Shell Flour			
Stan Shell*	ton	45.00	75.00
Pyrophyllite			
No. 261*	ton	——	- 11.50
Pyrax A* (c.l.)	ton	14.50	- 15.00
WA* (c.l.)	ton	17.00	- 17.50
Sawdust, Graded	ton	14.00	- 35.00
Silica	ton	16.00	- 27.00
Extra Fine (bags) (c.l.)	ton	——	- 43.00
Slate, Powdered (l.c.l.)	ton	15.00	- 20.00
Lo-Micron Slate Flour*	lb.	——	- .04½
No. 133 Slate Flour*	ton	——	- 4.55
Sodium Silico Aluminate			
Zeolex 23*	lb.	.06	- .07
Talc (Magnesium Silicate)			
Asbestol Regular*	ton	——	- 27.00
Eastern RC-500*	ton	——	- 32.00
No. 41*	ton	——	- 19.70
No. 549*	ton	——	- 63.00
French*	ton	——	- 59.00
No. 367*	ton	——	- 13.00
No. 1600*	ton	——	- 70.60
No. 1768*	ton	——	- 13.00
Nytal 200* (c.l.)	ton	——	- 28.00
300* (c.l.)	ton	——	- 38.00
Sierra Fibrene C-400*	ton	33.00	- 38.00
Sierra Supreme 325*	ton	48.75	- 57.25
Sierra White*	ton	20.75	- 31.75
Soapstone*	ton	——	- 13.00
Walnut Shell Flour	ton	55.00	-100.00
Agrashell*	ton	55.00	-115.00
Stan-Shell*	ton	50.00	-100.00
Whiting, Commercial	ton	——	- 7.50
Allied Whiting*	ton	10.50	- 21.50
Camel-Carb*	ton	——	- 10.00
Calwhite (c.l.)	ton	——	- 20.00
C-C-O White*	ton	——	- 22.00
Georgia Marble No. 15*	ton	——	- 20.00
No. 16*	ton	——	- 20.00
Piqua No. 1 YAA* (c.l.)	ton	10.00	- 10.00
No. 2 LS* (c.l.)	ton	10.00	- 10.00
Snowflake* (c.l.)	ton	——	- 20.00
Stan-White 325*	ton	11.50	- 14.10
Ultrasil*	lb.	.35	- .50
Veroc* (c.l.)	ton	——	- 11.50
Welco* (c.l.)	ton	——	- 10.50
York White R* (c.l.)	ton	——	- 11.00
Wood Flour	ton	31.50	- 48.00

FINISHING MATERIALS, SURFACE

Bosco Finishes*	gal.	2.10	- 2.35
Black Out*	gal.	4.50	- 8.00
Shellac, Orange Gum	lb.	.40	- .50
VanWax*	ga.	1.45	- 1.50

FLAME RETARDANTS

Cellulfex CEF* (dms.)	lb.	——	- .65
Chlorowax 40*	lb.	.15¼	- .17¼
50*	lb.	.16¾	- .17¾
70*	lb.	.18½	- .20
Halowax*	lb.	.36	- .46
Zinc Borate 3167*	lb.	.1920	- .2020
Zyrox Compounds*	lb.	.93	- .95½

LATEX MODIFIERS

Ludox	lb.	.15	- .16¾
OPD-101*	lb.	.29	- .36
Piccopale A-1 Emulsion	lb.	.086	- .113
Ubatol U-2001* (t.c.)	lb.	.166	- .187
U-2003* (t.c.)	lb.	.184	- .208
U-2007* (t.c.)	lb.	.166	- .187
U-3025* (c.l.)	lb.	.223	- .235
U-3040* (c.l.)	lb.	.260	- .272
U-3045* (c.l.)	lb.	.260	- .272
U-3050* (c.l.)	lb.	.195	- .207

LUBRICANTS, MOLD

Akro Gel*	lb.	——	- .165
Alipal CO-433*	lb.	——	- .20
CO-436*	lb.	——	- .24
Aluminum Stearate Crown Brand*	lb.	.37	- .42
Amine, Mixed Crude*	lb.	.19	- .25
Aquadag*	lb.	3.50	- 4.00
Aquarex D*	lb.	——	- .81
L*	lb.	——	- .94
ME*	lb.	——	- .82
MDL*	lb.	——	- .33
WAQ*	lb.	——	- .22
Armeen HT*	lb.	.34	- .40
180*	lb.	.52	- .56
Armid HT (flaked)*	lb.	.42	- .46
0*	lb.	.39	- .41
Borax, Granular (l.c.l.)	ton	89.00	- 94.00
Carbowax 4000*	lb.	.31	- .32
CD Mold Release B*	gal.	5.00	- ——
B-2*	gal.	5.00	- ——
Colite Concentrate* (dms.)	gal.	.90	- 1.15
Colite D43D*	gal.	1.15	- 1.40
Concentrex*	lb.	——	- .25
Dag Dispersions No. 197*	lb.	1.85	- 2.90
D.C. 7 Compound*	lb.	5.05	- 6.50
D.C. Emulsion No. 7*	lb.	1.59	- 2.07
No. 8*	lb.	1.20	- 1.74
No. 35*	lb.	1.20	- 1.74
No. 35A*	lb.	1.20	- 1.74
No. 35B*	lb.	1.20	- 1.74
No. 36*	lb.	1.20	- 1.74
D.C. Mold Release Fluid*	lb.	3.04	- 3.61
Dri-Lube*	lb.	——	- .22
Emulsion Lubricant A80*	lb.	——	- 1.20
45*	lb.	——	- 1.20
G-E Silicone Emulsion SM-55*	lb.	1.18	- 1.74
SM-61*	lb.	1.18	- 1.74
SM-62*	lb.	1.18	- 1.74
G-E Silicone Fluid SF-92*	lb.	3.04	- 4.25
SF-96*	lb.	3.04	- 4.25
Hawkeye Flake* (dlvd.)	lb.	.15	- .15¾
HSC No. 35*	lb.	1.22	- 2.46
No. 515	lb.	1.22	- 2.46
Igepal CO-430*	lb.	——	- .29
CO-630*	lb.	——	- .29
CO-530*	lb.	——	- .29
Igepon AP-78*	lb.	——	- .48
T-33*	lb.	——	- .21
T-51*	lb.	——	- .13½
Kokobace R*	lb.	.17½	- .18½
Lipal 9-N*	lb.	.28	- .29
7-O*	lb.	.29	- .30
Lubrex	lb.	.25	- .30
Lubri-Flo*	gal.	10.00	- 12.00
Migralube*	lb.	——	- .35
ML-1027-2C*	gal.	——	- 2.65
ML-1028-2C*	gal.	——	- 2.65
Mold Lubricant No. 72 Conc.* (dms.)	gal.	——	- 1.90
Mold Lubricant No. 735* (dms.)	gal.	——	- 1.25
No. 769* (dms.)	gal.	——	- 1.20
No. 825* (dms.)	gal.	——	- 2.00
No. 856* (dms.)	gal.	——	- 1.90
No. 880* (dms.)	gal.	——	- 1.19
No. 887* (dms.)	gal.	——	- 1.80
No. 935* (dms.)	gal.	——	- 1.56
No. 956* (dms.)	gal.	——	- 2.50
No. 965* (dms.)	gal.	——	- 2.15
No. 967* (dms.)	gal.	——	- 2.40
No. 969* (dms.)	gal.	——	- 1.50
No. 975* (dms.)	gal.	——	- 2.85
No. 980* (dms.)	gal.	——	- 1.53
No. 987* (dms.)	gal.	——	- 2.45
A 187* (dms.)	gal.	——	- 1.90
A 256* (dms.)	gal.	——	- 1.20
A 988* (dms.)	gal.	——	- 2.60
Moldeze No. 3*	gal.	——	- 4.95
Mold-Brite*	gal.	——	- 1.50
Monopole Oil MD*	lb.	——	- .16
MR-22 Silicone Semi-Permanent	gal.	9.95	- 14.95
Olate Flakes*	lb.	.23½	- .24¼
Orvus WA Paste* (dms.)	lb.	——	- .23¼
Plaskon Polyethylene S*	lb.	.32	- .47
Poly-Brite PE-20	lb.	.28	- .42
600	lb.	.42	- .58
Poly-Cone 125X	lb.	1.20	- 1.40
1,000	lb.	.93	- 1.06
Polyglycol 15-200*	lb.	.25	- .28¾
E4000*	lb.	.31	- .37
Prodag*	lb.	.30	- .52
Purity Flake* (dlvd.)	lb.	.18¾	- .19¼
Rubber-Flo*	gal.	1.25	- 2.00
Rubber-Glo*	gal.	——	- .94
Rusco Mold Paste*	lb.	——	- .25
Sericite* (l.c.l.)	ton	65.00	- 75.00
Silicone Oil A145*	lb.	3.22	- 3.61
A220* (dms.)	lb.	——	- 2.80
Silrex (dms.)	lb.	——	- .65
A65*	lb.	2.50	- 2.75

LUBRICANTS, MOLD (Cont'd)

Soybean Lecithin	lb.	.13	- .17
Thermalube*	lb.	——	- .13¾
UC Silicone L-45*	lb.	3.04	- 4.75
L-522*	lb.	2.68	- 3.50
LE-45*	lb.	1.20	- 1.70
LE-450*	lb.	1.20	- 1.70
Ucon Lubricants*	lb.	.26¼	- .27¾
Ulco Mold Soap*	lb.	.19	- .29

LUBRICANTS, RUBBER

Diglycol Stearate Neutral (and SE) (dms.)	lb.	——	- .25
Extrud-o-Lube*	gal.	1.33	- 1.54
G.B. Naphthenic Neutrals*	gal.	.11	- .18
Ivory Chips*	lb.	.19¾	- .20¾
Latex-Lube GR* (dlvd.)	lb.	.19¼	- .20
No. 82-A* (450 lb. dms.)	lb.	——	- .08½
Propylene Stearate (dms.)	lb.	.35	- .60

LUBRICANTS, RUBBER SURFACE

Barium Stearate	lb.	.41	- .46
Calcium Stearate	lb.	.39	- .44
Crown Brand*	lb.	.37	- .42
D.C. 7 Compound*	lb.	5.05	- 6.50
D.C. 200 Fluid*	lb.	3.04	- 3.61
ELA*	lb.	——	- .82
G-E Silicone Fluid SF-92*	lb.	3.04	- 4.25
Glycerized Lubricant*	gal.	1.25	- 1.49
Glydag B*	lb.	1.50	- 2.10
Glyso-Lube* (dms.)	lb.	——	- .14
No. 3* (dms.)	lb.	——	- .14
HSC No. 35*	lb.	1.28	- 1.34
No. 515*	lb.	1.28	- 1.34
Hydro-Zinc*	lb.	——	- .20
Latex-Lube Pigmented* (dlvd.)	lb.	.17¼	- .18¾
R-66*	lb.	——	- .16½
Liqui-Lube* (dlvd.)	lb.	——	- .16¾
N.F.* (dlvd.)	lb.	——	- .16¾
N.T.* (dlvd.)	lb.	——	- .16¾
Lubrex*	lb.	.25	- .30
Lubri-Cote	gal.	.86	- 1.00
Magnesium Stearate	lb.	.42	- .47
Crown Brand*	lb.	.40	- .45
Polyethylene Glycol	lb.	.22	- .26
Rubber Free (Concentrate)*	gal.	——	- 1.44
Jel*	lb.	.18	- .21½
Separex*	lb.	——	- .10½
Slab-Dip* (dms.)	lb.	——	- .17
Soybean Lecithin	lb.	.13	- .17
Stock-Lube*	lb.	——	- .19
UC XL-42*	lb.	3.14	- 4.75
XLE-42*	lb.	1.22	- 1.70
XLE-420*	lb.	1.22	- 1.70
Zinc Stearate	lb.	.41	- .46

MOLD CLEANERS

Actusol* (dlvd.)	gal.	1.45	- 1.65
Alkon* (dlvd.)	lb.	.16	- .16½
CA-301*	gal.	——	- 2.49
CA-302*	gal.	——	- 2.63
G-O 6910*	lb.	.38	- .40
Metso Anhydrous*	cwt.	5.70	- 7.95
Metso 99*	cwt.	5.00	- 7.25
200*	cwt.	6.70	- 8.95
Granular*	cwt.	4.45	- 6.70
Orvus Extra Granules*	lb.	.23¼	- .24¾
Polo*	lb.	.12¾	- ——
Rubber-Sol*	gal.	2.97	- 3.97
Shelblast*	lb.	.04	- .08½
Sprex A.C.* (dlvd.)	lb.	.17¾	- .18¾
Zip Mold Cleaner*	gal.	1.05	- 1.55

PEPTIZING AGENTS

Peptizer P-12*	lb.	.95	- 1.25
Pepton 22 Plasticizer*	lb.	.83	- .86
65*	lb.	1.23	- 1.26
65B*	lb.	.83	- .86
Pitt-Consol 640 (dms.)	lb.	.37	- .42
RPA 2*	lb.	——	- .85
3*	lb.	——	- .51
3 Conc.*	lb.	——	- .85
5*	lb.	——	- 1.10
6*	lb.	——	- 1.66

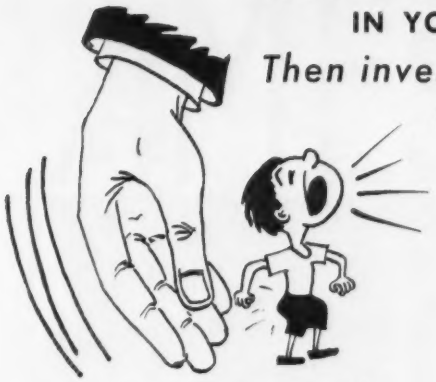
PLASTICIZERS & SOFTENERS

Acto 500*	lb.	——	- .09
Adipol BCA*	lb.	.45	- .45½
2EH*	lb.	.42½	- .43½
10A*	lb.	.42½	- .43½
ODY*	lb.	.45½	- .46½
810*	lb.	.42½	- 45¼
XX*	lb.	.42½	- .43½
Admex 562 (dms.)	lb.	.50¼	- .51¼
710 (dms.)	lb.	.35¼	- .36¼
711 (dms.)	lb.	.37¼	- .38¼
744 & 745 (dms.)	lb.	.41¼	- .42¼
760 (dms.)	lb.	.59¼	- .60¼
761 (dms.)	lb.	.46¼	- .47¼

HAVE YOU A "PROBLEM CHILD"

IN YOUR COMPOUNDING DEPARTMENT?

Then investigate these helpful "Factice" facts!



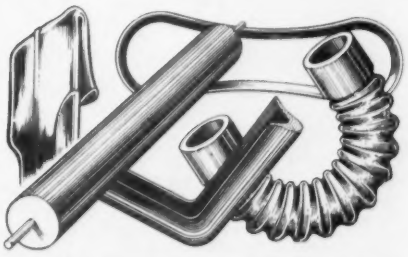
Neophax is

- compatible with Neoprene, synthetics, and crude rubber,
- aids in processing,
- improves extrusion, maintains die size,
- stabilizes mold dimensions,
- permits wide durometer range,
- yields ultimate plasticizing.

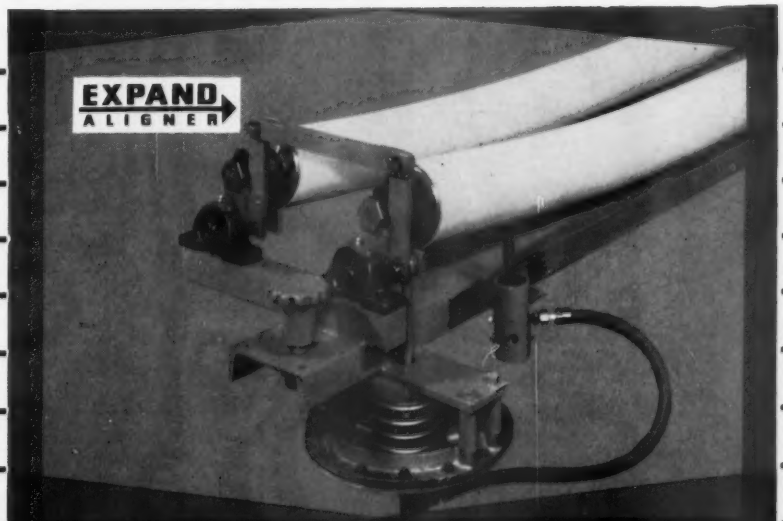
FACTICE®

Neophax®

Feel free to submit your problems to us. Just explain your difficulty, or describe the effect you wish to achieve. Without obligation, our laboratory will gladly make helpful recommendations. Data on request any time.



THE STAMFORD RUBBER SUPPLY CO., STAMFORD, CONN.



ROLL CAMBER ADJUSTED BY FABRIC EDGE GAGE
FOR PRECISE CONTROL OF WIDTH, CENTERING AND EDGE
CONDITION OF TIRE FABRICS AND OTHER OPEN WEAVES
DURING WEB PROCESSING . . . *Bulletin on Request*

C. A. LITZLER CO., INC.

1817 BROOKPARK RD. CLEVELAND 9, OHIO CABLE "CALITZ"

EXPORT REPRESENTATIVE: GILLESPIE & CO. OF N. Y., 96 WALL ST., NEW YORK 5, N. Y.

PLASTICIZERS & SOFTENERS (Cont'd)

Anhydrol 6990*	lb.	.51	.56
Arneel SD*	lb.	.34	.40
Arolene 1980* (c.l.)	lb.	—	.10
Aromatic Plasticizer 10* (and 25*) (dms.)	lb.	.06	.07½
Aromatic Tar	gal.	.0573	.1973
Bardol*	lb.	.02¼	.03¼
B*	lb.	.06¼	.06½
Bayol D*	gal.	—	.382
F*	gal.	—	.52
Bearflex 1751*	lb.	.15	.18½
Beeswax, Bleached	lb.	73	.75
Yellow Refined	lb.	.64	.65
Bondogen*	lb.	.55½	.60½
B.R.C. No. 20*	lb.	.0150	.0175
No. 21*	lb.	.02¾	.03
No. 22*	lb.	.02½	.02¾
B.R.H. 2*	lb.	.0213	.0351
BRS 700*	lb.	.0200	.0285
B.R.T. 3*	lb.	.0180	.0265
4*	lb.	.0250	.0260
7*	lb.	.0300	.0310
B.R.V.*	lb.	.0475	.0565
Bunarex Resins*	lb.	.07	.08
Bunatak AH*	lb.	—	.09½
N*	lb.	—	.31
U*	lb.	—	.17½
No. 90*	lb.	—	.09
No. 210*	lb.	—	.14
Butac*	lb.	.12½	.13½
Butyl Carbitol Periargonate (dms.)	lb.	—	.64½
Butyl Cellosolve Periargonate (dms.)	lb.	—	.68
Butyl Oleate	lb.	.25½	.26½
Butyl Palmitate	lb.	—	.26½
Butyl Stearate (dms.)	lb.	.22¼	.25¼
Califlux 510* (and 550*)	lb.	.02¾	.03¾
G.P.*	lb.	.01½	.02½
R-100*	lb.	.04¾	.05¾
TT*	lb.	.0195	.0295
Candelilla Wax, Prime	lb.	.53	.64
Refined Light	lb.	.56	.57
Carbowax 4000* (dms.)	lb.	.68	.70
Cardolite NC-103*	lb.	.36	.59
Carnauba Wax, Crude	lb.	.72	.74
Flaked	lb.	.73	1.25
Refined, Technical	lb.	.73	.74
Refined, Pure	lb.	.80	.88
Yellow	lb.	1.22	1.26
Celluflex* (dms.)			
112* (t.c., dlvd.)	lb.	—	.32½
179-A* (t.c., dlvd.)	lb.	—	.32½
179-C* (t.c., dlvd.)	lb.	—	.32½
179-EG* (t.c., dlvd.)	lb.	—	.32½
DBP* (t.c., dlvd.)	lb.	—	.30
DOP* (t.c., dlvd.)	lb.	—	.28½
TPP* (dms., eqld.)	lb.	—	.40
Ceresin Wax	lb.	.12	.30
Chlorowax 40*	lb.	.15¼	.17¼
50*	lb.	.16¾	.17¾
70*	lb.	.18½	.20
LV*	lb.	.17¾	.19¾
CTLA Polymer*	gal.	.20	.36
Cumar Resins*	lb.	.07	.19
Darex DBM*	lb.	.30½	.34
DBP*	lb.	.30	.33½
DOP*	lb.	.30½	.33½
DIOP*	lb.	.30½	.33½
D.B.M.*	lb.	.32	.34¼
Decylbutyl Phthalate	lb.	.27	.29½
Degras, Common	lb.	—	.14
Diallyl Phthalate	lb.	.51½	.52½
Dibenzyl Sebacate (dms.)	lb.	.93	.93½
Dibutoxyethyl Sebacate	lb.	—	.56¾
Dibutyl Phthalate (dms.)	lb.	.28½	.30
Dibutyl Sebacate	lb.	.67½	.68½
Dicapryl Adipate (dms.)	lb.	.41½	.42½
Dicapryl Phthalate (dms.)	lb.	.29	.30
Dicapryl Sebacate	lb.	.58	.59½
Di-Carbitol Phthalate (dms.)	lb.	.49	.49½
Dicyclohexyl Phthalate	lb.	.58¼	.59¼
Diethyl Phthalate (dms.)	lb.	.27½	.29
Di-2-ethylhexyl Phthalate (dms.)	lb.	.27½	.29
Dihexyl Adipate (dms.)	lb.	.46½	.47½
Dihexyl Phthalate (dms.)	lb.	.32½	.33½
Dihexyl Sebacate (dms.)	lb.	.66	.66½
Diisobutyl Azelate	lb.	—	.47¾
Di-iso-octyl Adipate	lb.	.42½	.43½
Dimethyl Phthalate (dms.)	lb.	.27½	.29
Dimethyl Phthalate	lb.	.32	.33
Dimethyl Sebacate (dms.)	lb.	1.30	1.30½
Dinonyl Adipate	lb.	.44½	.47½
Dinopol 235*	lb.	.36	.37
IDO*	lb.	.31	.32
MOP*	lb.	.31½	.32½
Dioctyl Adipate (dms.)	lb.	.42½	.43½
Dioctyl Phthalate (dms.)	lb.	.30½	.31½
Dioctyl Sebacate (dms.)	lb.	.61¼	.61¾
D.I.O.P. (dms.)	lb.	.30½	.31½
Dipolymer Oil	gal.	.33	.48
Dispersing Oil No. 10*	lb.	.06	.06¼
Dutrex* 1, 6, 7	gal.	.18	.23
6H	gal.	.13	—
15E	gal.	.11	.23
20, 25	lb.	.03	.06
33	gal.	.21	.33
Elastex 10-P*	lb.	.30½	.33½
50-B*	lb.	.25	.28
DCHP*	lb.	.59	.60
Emulphor EL-719*	lb.	—	.58
Epoxy Plasticizer	lb.	.33½	.36
Drapex 3.2*	lb.	.39¼	.40¼
Drapex 4.4*	lb.	.34¾	.35¾
Drapex 7.7*	lb.	.37	.38

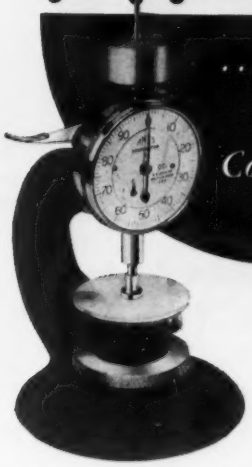
PLASTICIZERS & SOFTENERS (Cont'd)

Esparto Wax	lb.	—	.55
Estac*	lb.	—	.16
Facile Gum 4A*	lb.	.48	.50
Flexol B-400*	lb.	.27½	.28½
DOP*	lb.	.30½	.31½
TOF*	lb.	.45½	.46½
3GH*	lb.	.46	.46¾
3GO*	lb.	.55	.55¾
4GO*	lb.	.35	.36
426*	lb.	.29½	.30½
Flexricin P-1*	lb.	.33½	.36½
P-4*	lb.	.30½	.33¾
P-6*	lb.	.37	.40
P-8*	lb.	.30¼	.33¼
Fortex A* (dms.)	lb.	.12½	.14½
Fura-Tone NC-1008*	lb.	.28	.39
Galex W-100*	lb.	.15½	.19¾
G.B. Asphaltic Flux*	gal.	.0970	.1770
G.B. Light Process Oil*	lb.	.02¾	.03¾
Medium Process Oil*	lb.	.03¼	.04¼
G.B. Naphthenic Neutrals*	gal.	.12½	.21½
Good-rite GP233*	lb.	.40	.43½
GP235*	lb.	.40	.43½
GP236*	lb.	.40	.43½
GP261*	lb.	.28	.31½
GP265*	lb.	.28½	.32
GP266*	lb.	.29	.32½
GP-266-BPA*	lb.	.29	.32½
Hallco C-255-NS*	gal.	.27½	.29½
C-566*	lb.	.11	.13
Harflex 300* (dms.)	lb.	.60½	.61½
325* (dms.)	lb.	.45	.46
375* (dms.)	lb.	.76	.77
500* (dms.)	lb.	.34	.35
HB20*	lb.	.15	.17
HB40*	lb.	.21	.22
Herron-H.T.*	gal.	.16	.27
Herron-Plas*	lb.	—	.03¾
Herron-Wax*	lb.	.05¼	.06
No. 23*	lb.	.08¼	.08¾
No. 24*	lb.	.07¼	.07¾
HSC No. 13*	lb.	.25	.32
No. 28 and 38*	lb.	.20	.27
Indonex 632½* (633½*, 634½*, 637½*)	gal.	.12	.19
Isooctyl Decyl Phthalate (dms.)	lb.	.31	.32
Kapsol*	lb.	.35	.35½
Kenflex A & N*	lb.	.19	.34
Kesscoflex BCL* (dms.)	lb.	—	.37
BCO* (dms.)	lb.	—	.33
BCP* (dms.)	lb.	—	.36
BCS* (dms.)	lb.	—	.32
BO* (dms.)	lb.	—	.28½
BS* (dms.)	lb.	—	.27½
DBT* (dms.)	lb.	—	.68
DIOA* (dms.)	lb.	—	.43½
DOA* (dms.)	lb.	—	.43½
MCO* (dms.)	lb.	—	.35½
MCP* (dms.)	lb.	—	.41
MCS* (dms.)	lb.	—	.35
TRA* (dms.)	lb	—	.40
KP 23*	lb.	.31½	.32½
90*	lb.	.42½	.43½
140*	lb.	.48	.48½
201*	lb.	.58	.59
220* & 260*	lb.	.35½	.36½
666*	lb.	.59½	.60
Kremol 40*	gal.	.36	.46
50*	gal.	.39	.49
Kronisol* (dms.)	lb.	.33	.36
Kronitex AA* (dms.)	lb.	.35	.36
1* (dms.) and K-3*	lb.	.35	.36
MX*	lb.	.35	.36
Lanolin, Tech. Anhydrous	lb.	—	.26
Latex-Lube G.R.*	lb.	.19¼	.20
Lead Oleate	lb.	—	.29¾
Lindol* (dms., t.c.)	lb.	—	.32½
Locusol No. 1-6980*	lb.	.30	.34
2-Mercaptoethanol (dms.)	lb.	1.25	1.50
Methox*	lb.	.40½	.41
Methyl Laurate	lb.	.25	.27
Methyl Oleate	lb.	—	.20
Methyl Stearate (dms.)	lb.	—	.30
Monoplex DOS*	lb.	.59½	.60½
DBS*	lb.	.65½	.66½
S-70*	lb.	.41	.42
S-71*	lb.	.46½	.47½
Montan Wax, Crude	lb.	.22	.29
Flaked	lb.	.29	.29
Morflex*	lb.	.32	.69½
Natac*	lb.	.12	.13
Nebony Resins* (dms.)	lb.	.04½	.05
Neolene 210* (t.c.)	lb.	—	.16
212* (t.c.)	lb.	—	.14
220* (t.c.)	lb.	—	.15
Nerium*	lb.	—	.09
Nevillac Resins* (dms.)	lb.	.31	.85
Neville LX-880* (dms.)	lb.	.12	.13½
LX-685* (dms.)	lb.	.12½	.17½
Neville Resins* (dms.)	lb.	.07¼	.20
Nevindene Resins* (dms.)	lb.	.16½	.20
Nevinol* (dms.)	lb.	—	.24
Nuba 1* (and 2*) (dms.)	lb.	.06¼	.06¾
No. 480 Oil Proof Resin*	lb.	—	.18
Ohopex Q10* (dms.)	lb.	.30½	.31½
R9* (dms.)	lb.	.37¼	.37¾
Ortho-Nitrobiphenyl	lb.	.13	.15
Ozokerite Wax, White and Yellow	lb.	.24	.31
Paradene Resins (dms.)	lb.	.07¼	.08
No. 2 Flaked	lb.	.08	.08½
Para Flux* (dms.)	gal.	.22	.25
2016* (dms.)	gal.	.22	.26
Para Lube* (t.c.l.)	lb.	.046	.048

PLASTICIZERS & SOFTENERS (Cont'd)

Paraplex G-25*	lb.	.76	.77
G-40*	lb.	.50	.51
G-50*	lb.	.40¾	.41¼
G-53*	lb.	.45	.46
G-60* (and G-61*)	lb.	.35	.36
G-62*	lb.	.37	.38
Parmo*	lb.	.06	.13½
PG-16*	lb.	—	.35
Philrich-5* (t.c.)	gal.	—	.12½
Picco 10* (and 25*)	lb.	.15	.15½
60* (and 75*)	lb.	.14½	.15
100*	lb.	.14½	.17
Piccocizer 30*	lb.	.05½	.07
Piccolastic A* (B*, C*, D* & E*)	lb.	.24	.25
FT* (FHX* & FX*)	lb.	.1695	.1745
T-135*	lb.	.19	.20
Piccolyte S Resins*	lb.	.20½	.23½
Piccopale Resins*	lb.	.12	.13
Piccoumaron Resins*	lb.	.07	.24½
Pigmentar* Pigmentaroil*	lb.	.0460	.0634
Plastac M*	lb.	—	.09¼
Plasticizer 2286*	lb.	—	.26¼
Plasticizer 4141*	lb.	.42½	.43½
Plasticizer DP-200, DP-250, DP-520*	lb.	.45	.45¾
DP-316*	lb.	.32¾	.33½
DP-317*	lb.	.46	.47¼
DP-8732*	lb.	.44¾	.46
Plasticizer LP*	lb.	—	.07
Plasticizer MP*	lb.	—	.08
Plasticizer MT-511*	lb.	—	.68¾
Plasticizer ODN*	lb.	.35	.41
Plasticizer SC*	lb.	.42½	.43½
Plasticizer W-13*	lb.	.37	.38¾
Plastoflex 3*	lb.	—	.52
52*	lb.	.37¾	.38¾
VS*	lb.	.41¾	.42¾
Plastogen*	lb.	.08¾	.09
Plastolein 9050* (c.l.)	lb.	.54½	.56½
9055*	lb.	.30½	.32½
9058*	lb.	.48	.50
9250*	lb.	.38¼	.40¼
9715*	lb.	.39	.40
Plastone	lb.	.23	.27
Polycizer 162*	lb.	.28	.31½
332*	lb.	.29	.32½
562*	lb.	.28½	.32
662*	lb.	.29	.43½
532 and 632*	lb.	.40	.41¾
ED*	lb.	—	.51
Polyco 438*	lb.	.34	.35
Polymel C-130*	lb.	.13¾	.14¾
D*	lb.	.22½	.23½
6*	lb.	.05¾	.07¾
Poly-Sperse AP-2	lb.	.23	.29½
AP-300, LC-20	lb.	.26	.32½
Poly-Sperse R-100	lb.	.17	.23½
Process Oil C-255* (c.l.)	gal.	.27½	.29½
Propylene Stearate (dms.)	lb.	—	.32
PRR 1*	gal.	.15	.35
PT 101 Pine Tar Oil* (t.c., dms.)	lb.	.0380	.0554
400 Pine Tar* (600* & 800*) (t.c., dms.)	lb.	.0380	.0554
PX-104*	lb.	.30	.32½
PX-108*	lb.	.30½	.33
PX-138*	lb.	.32½	.33½
PX-208*	lb.	.44½	.45½
PX-238*	lb.	.44½	.45½
PX-404*	lb.	.66	.67
PX-438*	lb.	.60	.61
PX-800*	lb.	.34	.35
PX-917*	lb.	.36½	.37½
RC Plasticizer B-17* (dms.)	lb.	.23½	.24½
O-16* (dms.)	lb.	.30	.31
TG-8* (dms.)	lb.	.34½	.35½
TG-9* (dms.)	lb.	.34½	.35½
TG-85* (dms.)	lb.	.36½	.37½
RC Polymeric BGA* (dms.)	lb.	.45½	.46½
Reogen*	lb.	.14½	.14½
465 Resin* (dms.)	lb.	.07½	.08
Resin C*	lb.	.0225	.0310
Resinex*	lb.	.03¾	.05¼
L-4*	lb.	.02¾	.03¼
Rexflex*	lb.	—	.15
Rosin Oil	gal.	.80	1.35
RR-10 (Neoprene)*	lb.	—	.37
R.S.O. Softening Oil*	lb.	.03	.05
RuBars*	lb.	.19¼	.20
Rubberol*	lb.	.18	.25¼
Santicizer B-16*	lb.	.48¾	.49¾
E-15*	lb.	.54	.55
M-17*	lb.	.46	.47
No. 140*	lb.	.35	.36
No. 141*	lb.	.36	.37
No. 160*	lb.	.29	.30
No. 602*	lb.	—	.28½
No. 603*	lb.	—	.27
Sherolatum*	lb.	.03½	.06
Staflex DBES*	lb.	.58	.60½
DOS*	lb.	.58	.60½
IXA*	lb.	.32	.35
KA*	lb.	.36	.38¼
Stan Chlor Oils*	lb.	.13½	.20½
70*	lb.	.17½	.30
Stanolind Petrolatum*	lb.	.07	.156
Wax*	lb.	.31	.33
Sunny South Burgundy Pitch*	lb.	.1030	.1085
Rosin Oil*	gal.	.58	.76
Superla Wax*	lb.	.30	.397
Syncera Wax*	lb.	.16	.267
Syn Tac* (c.l.)	gal.	—	.33
Synthetic Revertant Oil	lb.	—	.16

AMES



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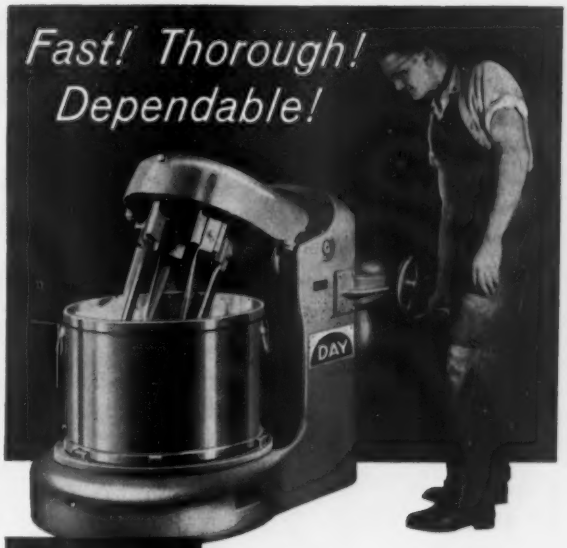

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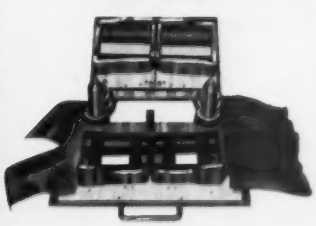
INDEPENDENT AND NEW ERA

Dies For Every Conceivable Purpose

CLICKER, WALKER PUNCH PRESS and MAUL HANDLE

DISTRIBUTORS FOR:

- Foles Clicker Machines and Seelye Beam Die Presses
- Hard Maple, Rubber, and Fibre Composition Die Blocks
- Rubber Pads
- Die Block Hardener
- Raw Hide Mauls



INDEPENDENT DIE & SUPPLY CO.

2602 LA SALLE PLACE... ST. LOUIS 4, MISSOURI

Associate: NEW ERA DIE CO. Red Lion, York County, Pa.

Lacquers for Rubber...

Manufacturers of quality lacquer products for industry, equipped to fill your lacquer needs quickly and economically.

CLEAR AND COLORED

- NEW, improved LACQUERS for Rubber Footwear, or any rubber product where lacquer is used as a pre-cure coating.
- SOLE and HEEL LACQUERS. Eliminate seconds by using our special pigmented lacquers. Can be supplied in any color desired.
- NCP 1909. An anti-tack coating. Spray or brush it on any tacky surface where powder is normally used to kill tack before cure.
- CASUALS, footwear. NCP 1909 is an excellent dulling and anti-tack agent on edges of soles or crepe wrappers used in the manufacturing of casual type footwear.
- SPECIAL lacquers for all types of rubber products.

Write for complete details

The National Chemical & Plastics Co.

1424 Philpot Street • Baltimore 31, Maryland

PLASTICIZERS & SOFTENERS (Cont'd)

Tar, Refined	gal.	.1200 -	.1760
Tarpine	lb.	.035 -	.050
Terpene A*	gal.	—— -	.65
Tetraflex R-122*	lb.	.27 -	.30½
TP-90B*	lb.	.59 -	.69
TP-95*	lb.	.65 -	.75
Transphalt Resins*	lb.	.03¾ -	.05¼
Tributyl Phosphate	lb.	.52½ -	.53½
Tricresyl Phosphate	lb.	.32½ -	.36
Turgum S*	lb.	.10¾ -	.11¾
Turgum SB*	lb.	.06¾ -	.07¾
Turpol NC-1200*	lb.	.67 -	.70
NC-1300*	lb.	—— -	.50
Vanadiset B*	lb.	.036 -	.07
C*	lb.	.031 -	.06
MR 80 Mesh*	lb.	.08½ -	.12½
Vistac No. 1*	gal.	1.00 -	1.21
P*	lb.	.18 -	.18½
Vopcolene 50*	lb.	—— -	.31
Witcizer 100*	lb.	.26 -	.27
200*	lb.	.22¼ -	.25¼
300*	lb.	.30 -	.33½
312*, 313*	lb.	.28 -	.31½
412*	lb.	.42½ -	.46

PROCESSING AIDS

Castor Oil, Blown (dms.)	lb.	.26½ -	.27½
Refined (dms.)	lb.	—— -	.18½
Castorwax*	lb.	.25 -	.31
Dutrex 7*	lb.	.12 -	.20
ELA*	lb.	—— -	.82
Hydrofol Glycerides 200*	lb.	.15½ -	.19¼
Kenflex N*	lb.	.19 -	.26
Maleic Anhydride	lb.	—— -	.27
Millrex*	lb.	—— -	.15
Nadic Anhydride	lb.	—— -	.75
Polycin*	lb.	—— -	.24½
Resin No. 510*	lb.	.19 -	.26
No. 529*	lb.	.25 -	.32
Pulverized*	lb.	.20½ -	.25
Thiomalic Acid	lb.	—— -	3.50
Zyrox*	lb.	.78 -	.88

PROTECTIVE & STABILIZING AGENTS

Acacia*	lb.	.12¾ -	.21
Alcogum*	lb.	.08½ -	.24
Alpha Protein	gal.	—— -	.23
Aroostoocrat*	lb.	—— -	.07½
Carob Bean Flour	lb.	—— -	.50
Casein	lb.	.22 -	.35
Emcol K-8300* (dms.)	lb.	.14 -	.18
Ethylene Diamine 68%	lb.	.44 -	.47
Gum Arabic	lb.	—— -	.23
Karaya Gum	lb.	—— -	.35
Locust Bean Gum	lb.	—— -	.50
Prosein*	lb.	—— -	.06
Stablex B*	lb.	.50 -	.95
K*	lb.	.27 -	.35

RECLAIMING AGENTS

Amalgamator Z-4*	lb.	.34 -	.35
Armeen C*	lb.	.46 -	.52
Mixed Crude*	lb.	.19 -	.25
T*	lb.	.32 -	.38
Burco RA*	lb.	.05 -	.081
BWH-1*	gal.	.17 -	.18
C-6 Oil* (28° & 32°)	gal.	.33 -	.38
C-10 Oil*	gal.	.25 -	.30
C-33* (t.c.)	gal.	—— -	.21½
C-42* (t.c.)	gal.	—— -	.23
Caustic Soda—Flake 76% (c.l., dms.)	cwt.	—— -	4.50
Liquid 50% (t.c.)	cwt.	—— -	2.80
Solid 76% (c.l., dms.)	cwt.	—— -	4.10
Cresylic Acid (99-100%)	gal.	.85 -	1.39
D-4* (t.c.)	gal.	—— -	.27
E-5* (t.c.)	gal.	—— -	.25
Flake Calcium Chloride (77-80%)	ton	—— -	29.00
G.B. Reclaiming Oil*	gal.	.13½ -	.21½
CD-10*	gal.	.11½ -	.19½
CD-50-U*	gal.	.19½ -	.27½
Gensol No. 6* (t.c.)	gal.	—— -	.42
Heavy Aromatic Naphtha	gal.	.13¼ -	.18½
LX-77 Reclaiming Solvent*	gal.	.21 -	.33
LX-572 Reclaiming Oil*	gal.	.27 -	.32
LX-777 Reclaiming Oil*	gal.	.23 -	.33
Neo-Fat D-242*	lb.	.05½ -	.07¾
42-70*	lb.	.08¼ -	.10¼
No. 517 H.B. Oil*	gal.	.11½ -	.16½
535*	gal.	.22 -	.27
Nucom* (t.c.)	gal.	—— -	.42
Pitt-Consol "500" (dms.)	lb.	.30 -	.30½
PT 101 Pine Tar Oil* (t.c., dms.)	lb.	.0380 -	.0554
Q Oil* (t.c.)	gal.	—— -	.286
Reclaiming Oil 3186-G*	gal.	.26 -	.33
Reclaiming Reagent No. 1431*	lb.	.21 -	.25
R.P.A. No. 3*	lb.	—— -	.51
RR-10*	lb.	—— -	.37
Soda Ash (c.l., bags)	cwt.	—— -	1.75
Solvent 534*	gal.	.20½ -	.26½
Solvent Oil 21*	gal.	.24 -	.29
C-42*	gal.	.23 -	.38
X-1 Resinous Oil*	lb.	.0225 -	.0325
701 Oil*	gal.	.27 -	.29

REINFORCING AGENTS—CARBON BLACK

Channel, Hard Processing (HPC) (bags)

Atlantic HPC-98*	lb.	.0775 -	.1450
Continental F*	lb.	.0775 -	.1450
Croflex*	lb.	.0775 -	.1450
Dixiedensed (and S)*	lb.	.0775 -	.1450
Kosmobile (and S)*	lb.	.0775 -	.1450
Micronex HPC*	lb.	.0775 -	.1450
Witco No. 6*	lb.	.0775 -	.1450

Channel, Medium Processing (MPC) (bags)

Arrow MPC*	lb.	.0775 -	.1350
Atlantic MPC-95*	lb.	.0775 -	.1450
Continental A*	lb.	.0775 -	.1450
Croflex TH*	lb.	.0775 -	.1450
Dixiedensed HR (and S-66)	lb.	.0775 -	.1450
Kosmobile HM (and S-66)	lb.	.0775 -	.1450
Micronex Standard*	lb.	.0775 -	.1450
Spheron 6*	lb.	.0775 -	.1450
Texas M*	lb.	.0775 -	.1450
Witco No. 1*	lb.	.0775 -	.1450

Channel, Easy Processing (EPC) (bags)

Atlantic EPC E-42*	lb.	.0775 -	.1450
Collocarb*	lb.	.0590 -	.1400
Continental AA*	lb.	.0775 -	.1450
Croflex 77*	lb.	.0775 -	.1450
Dixiedensed 77*	lb.	.0775 -	.1450
Kosmobile 77*	lb.	.0775 -	.1450
Micronex W-6*	lb.	.0775 -	.1450
Spheron 9*	lb.	.0775 -	.1450
Texas E*	lb.	.0775 -	.1450
Witco No. 12*	lb.	.0775 -	.1450
Wyex EPC*	lb.	.0775 -	.1350

Channel, Conductive (CC) (bags)

Continental R-40*	lb.	.2600 -	.3400
Dixie 5 Dustless*	lb.	.1350 -	.2100
Dixie Voltex*	lb.	.2600 -	.3400
Kosmink Dustless*	lb.	.1350 -	.2100
Kosmos Voltex*	lb.	.2600 -	.3400
Spheron C*	lb.	.1800 -	.2400
Voltex*	lb.	.2600 -	.3400

Channel, Surface Treated (STC) (bags)

Texas 109*	lb.	.0840 -	.1475

Conductive Furnace Black (CF) (bags)

Aromex CF*	lb.	.0875 -	.1450
Atlantic CF*	lb.	.0925 -	.1500
Continex CF*	lb.	.1050 -	.1550
Croflex CF*	lb.	.0925 -	.1500
Dixie CF*	lb.	.0925 -	.1500
Kosmos CF*	lb.	.0925 -	.1500
Shawinigan Acetylene Black*	lb.	—— -	.1900
Vulcan C*	lb.	.1100 -	.1750

Extra-Conductive Furnace Black (ECF) (bags)

Vulcan XC-72 (pellets)*	lb.	.2500 -	.3300

Furnace, Fast Extruding (FEF) (bags)

Arovel FEF*	lb.	.0675 -	.1250
Atlantic 125*	lb.	.0675 -	.1250
Continex FEF*	lb.	.0675 -	.1250
Croflex 50*	lb.	.0675 -	.1250
Dixie 50*	lb.	.0675 -	.1250
Kosmos 50*	lb.	.0675 -	.1250
Philblack A*	lb.	.$675 -	.1250
Statex M*	lb.	.0675 -	.1250
Sterling SO*	lb.	.0675 -	.1250

Furnace, Fine (FF) (bags)

Statex B*	lb.	.0725 -	.1300
Sterling 99*	lb.	.0725 -	.1300

Furnace, General Purpose (GPF) (bags)

Arogen GPF*	lb.	.0600 -	.1175
Atlantic 118*	lb.	.0600 -	.1175
Croflex 35*	lb.	.0600 -	.1175
Dixie 35*	lb.	.0600 -	.1175
Kosmos 35*	lb.	.0600 -	.1175
Statex G*	lb.	.0600 -	.1175
Sterling V*	lb.	.0600 -	.1175
V (Non-Staining)	lb.	.0600 -	.1175

Furnace, High Abrasion (HAF) (bags)

Aromex HAF*	lb.	.0775 -	.1350
Atlantic 130*	lb.	.0775 -	.1350
Continex HAF*	lb.	.0775 -	.1350
Croflex 60*	lb.	.0775 -	.1350
Dixie 60*	lb.	.0775 -	.1350
Kosmos 60*	lb.	.0775 -	.1350
Philblack O*	lb.	.0775 -	.1350
Statex R*	lb.	.0775 -	.1350
Vulcan 3*	lb.	.0775 -	.1350

REINFORCING AGENTS—CARBON BLACK (Cont'd)

Furnace, High Modulus (HMF) (bags)

Atlantic 120*	lb.	.0625 -	.1200
Continex HMF*	lb.	.0675 -	.1200
Croflex 40*	lb.	.0625 -	.1200
Dixie 40*	lb.	.0625 -	.1200
Kosmos 40*	lb.	.0625 -	.1200
Modulex HMF*	lb.	.0625 -	.1200
Statex 93*	lb.	.0625 -	.1200
Sterling L*	lb.	.0625 -	.1200
LL*	lb.	.0625 -	.1200

Furnace, Semi-Reinforcing (SRF) (bags)

Atlantic 115*	lb.	.0575 -	.1175
Continex SRF*	lb.	.0575 -	.1150
Croflex 20*	lb.	.0575 -	.1150
Dixie 20*	lb.	.0575 -	.1150
Essex SRF*	lb.	.0575 -	.1150
Furnex*	lb.	.0575 -	.1150
Gastex*	lb.	.0625 -	.1250
Kosmos 20*	lb.	.0575 -	.1150
Pelletex*	lb.	.0575 -	.1150
NS*	lb.	.0575 -	.1150
Shawinigan Acetylene Black*	lb.	—— -	.1900
Sterling NS*	lb.	.0575 -	.1150
K*	lb.	.0625 -	.1250
S*	lb.	.0575 -	.1150

Furnace Super Abrasion (SAF) (bags)

Atlantic 150*	lb.	.1150 -	.1650
Croflex 85*	lb.	.1150 -	.1650
Dixie 85	lb.	.1150 -	.1650
Kosmos 85	lb.	.1150 -	.1650
Philblack E*	lb.	.1150 -	.1725
Statex 160*	lb.	.1150 -	.1800
Vulcan 9*	lb.	.1150 -	.1800

Furnace, Super Abrasion, Intermediate (ISAF) (bags)

Aromex ISAF*	lb.	.0925 -	.1500
Atlantic 135*	lb.	.0925 -	.1500
Continex ISAF*	lb.	.0925 -	.1500
Croflex 70*	lb.	.0925 -	.1500
Dixie 70*	lb.	.0925 -	.1500
Kosmos 70*	lb.	.0925 -	.1500
Philblack I*	lb.	.0925 -	.1500
Statex 125*	lb.	.0925 -	.1500
Vulcan 6*	lb.	.0925 -	.1500

Furnace, Super Conductive (SCF) (bags)

Conductex SC*	lb.	.1150 -	.1800
Vulcan SC*	lb.	.1800 -	.2450

Thermal, Fine (FT) (bags)

P-33 (c.l.)*	lb.	—— -	.0575
Sterling FT (c.l.)*	lb.	—— -	.0575

Thermal, Medium (MT) (bags)

Shellblack*(†)	lb.	—— -	.0250
Sterling MT (c.l.)*	lb.	—— -	.0400
MT Non-Staining (c.l.)*	lb.	—— -	.0500
Thermax (c.l.)*	lb.	—— -	.0400
Stainless (c.l.)	lb.	——	.0500

REINFORCING AGENTS—SILICA

Cab-o-sil*	lb.	.67 -	.85
D. C. Silica (pelletized)*	lb.	1.45 -	1.65
Hi-Sil 233*	lb.	.08 -	.09½
X303*	lb.	.40 -	.45
Santocel*	lb.	.62 -	.64
Valron Estersil*	lb.	2.00 -	2.25

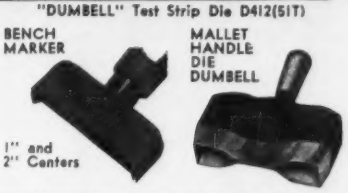
REINFORCING AGENTS—MISCELLANEOUS

Angelo Shellac*	lb.	.40 -	.50
Darex Copolymer No. 3*	lb.	.47 -	.49
43G*	lb.	.39 -	.41
Darex Copolymer Latex No. 3-L	lb.	.41½ -	.46
Durez 12687 (and 12707)*	lb.	.36½ -	.40
Durez 13355*	lb.	.27½ -	.31½
Good-rite Resin 2007*	lb.	.36 -	.38
2057*	lb.	.30 -	.31
Hystron*	lb.	.39 -	.41
Kralac A-EP*	lb.	.39 -	.41
Lampblack	lb.	—— -	.12
Marbon S and S-1*	lb.	.36 -	.43
8000*	lb.	.36 -	.43
Marmix	lb.	.35 -	.43
Mistron Vapor*	ton	—— -	70.00
HGO-55*	ton	—— -	95.50
Pliolite Latex 150*	lb.	.35 -	.39
Pliolite Resin-Rubber Masterbatches*	lb.	.33 -	.57
Pliolite NR*	lb.	.93 -	.95
S6B*	lb.	.36 -	.43
Plio-Tuf G85C*	lb.	.52 -	.54
Polyco 220*	lb.	.18¼ -	.19¼
Polypol S-70*	lb.	.25 -	.26

HOGGSON TOOLS, MOLDS, DIES

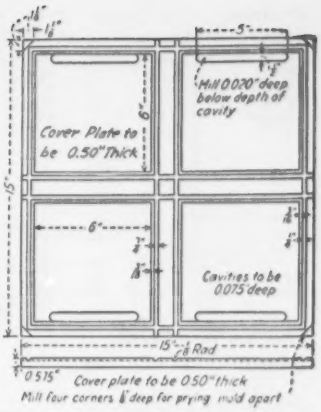
For Rubber Testing and Production

"DUMBELL" Test Strip Die D412(5IT)



For making tensile test samples, we make many types of slab molds. One is detailed at the right. These are plain or chrome finished. We usually stock molds for making adhesion, abrasion, flexing, compression and rebound test samples, but supply special molds promptly. We also furnish hand-forged tensile dies for cutting regular or tear test samples.

SLAB MOLD D15-55

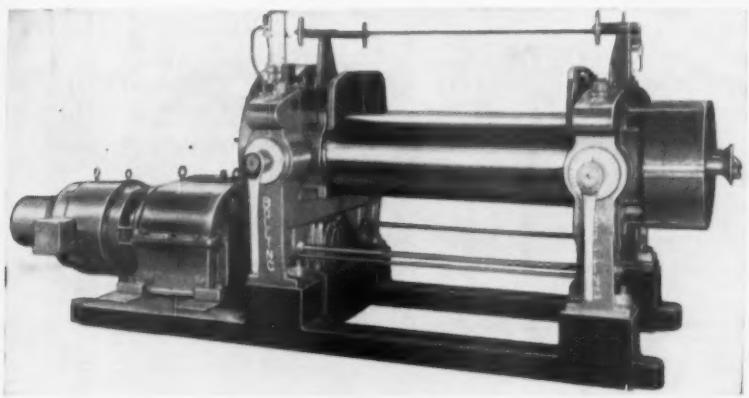

Mill 0.020" deep below depth of cavity
Cover Plate to be 0.50" Thick
Cavities to be 0.075 deep
0.515" Cover plate to be 0.50" thick
Mill four corners ⅛" deep for prying mold apart

HOGGSON & PETTIS MFG. CO., 141A Brewery St., New Haven 7, Conn.
Pac. Coast: H. M. Royal, Inc., Downey, Calif.

Suppliers...

Get the full story on the *new* RUBBER RED BOOK
See page 771

Here is Versatility with a Capital V



For Silicones and Other Materials, the No. 6 Bolling MULTI-purpose Mill...

Get all the facts about this versatile, all-purpose mill which, on 60" face rolls, processes silicones, gum and other types of softer materials. It also efficiently sheets stocks from an intensive mixer. Or,

The No. 6 is regularly equipped with 50" face rolls for standard mixing and warm-up service.

Or,

You may specify 42" rolls for extra rugged service on heavily loaded materials.

Ask For Bulletin "W-11"

STEWART BOLLING & COMPANY, INC.
3194 EAST 65th STREET • CLEVELAND 27, OHIO

• INTENSIVE MIXERS AND MILLS • CALENDERS • REFINERS • CRACKERS HYDRAULIC PRESSES • PUMP UNITS BALE SLITTERS • SPEED REDUCERS

RETARDERS

Benzoic Acid TBAO-2*	lb.	—	.44
Dutch Boy Normasal*	lb.	—	.46
ESEN*	lb.	.35	.37
Good-rite Vultrol*	lb.	.67	.70
Harcopol 1183*	lb.	.70	.74
Retarder J*	lb.	.62	.64
PD*	lb.	.39	.41
W*	lb.	—	.46
Retardex*	lb.	.46	.46
Wiltrol P	lb.	.39	.41

RUBBER SUBSTITUTES

Mineral Rubber

Byerlyte*	ton	50.00	57.00
Hard Hydrocarbon (dms.)*	ton	53.00	60.00
Herron Flake*	ton	—	45.00
Mineral Rubber, Solid	ton	42.50	44.50
M. R. No. 38*	ton	57.00	70.00

Vulcanized Vegetable Oils

Amberex*	lb.	.29	.36
Brown	lb.	.15	.24
Car-Bel-Lite*	lb.	—	.36
Neophax*	lb.	.17	.27
Polyrex A and C*	lb.	.12	.17
White	lb.	.15	.26
670 Brown	lb.	.14¼	.14¾

Miscellaneous Rubber Substitutes

G.B. Asphaltenes*	lb.	.06	.06½
Gilsowax B*	lb.	.09	.11
Resin No. 1098 (dms.)	lb.	—	.62
No. 1198*	lb.	.46¼	.49¾
Tysonite*	lb.	.26	.26¾

SOLVENTS

Acetone (dlvd.)	lb.	.11	.12½
Amsco Lactol Spirits* (t.c.)	gal.	—	.20
Naphthol Spirits*	gal.	—	.19
Mineral Spirits*	gal.	—	.18
Rubber Solvent* (t.c.)	gal.	—	.19
Solv A* (t.c.)	gal.	—	.22
Solv A-80* (t.c.)	gal.	—	.23½
Solv B* (t.c.)	gal.	—	.28
Solv B-90* (t.c.)	gal.	—	.31
Solv D* (t.c.)	gal.	—	.30
Solv E*	gal.	—	.30
Solv F*	gal.	—	.30
Solv F-80*	gal.	—	.32
Solv G*	gal.	—	.36
Special Naphtholite* (t.c.)	gal.	—	.19
Special Textile Spirits*	gal.	—	.20
Super Hi-Flash Naphtha*	gal.	—	.34
Super Naphtholite*	gal.	—	.19
Textile Spirits* (t.c.)	gal.	—	.20
Amyl Chlorides, Mixed (t.c.l.) (dms.)	lb.	—	.11
Benzol 90%	gal.	.36	.40
Butyl Acetate	lb.	.17	.18
Butyl Alcohol	lb.	.17	.18
Secondary (dlvd.)	lb.	.15	.16½
Tertiary (dlvd.)	lb.	.15	.16½
Carbon Bisulfide, Tech.	lb.	.0545	.0161
Carbon Tetrachloride	lb.	.10¾	.14¼
Cosol 1*	gal.	.37	.43
2*	gal.	.42	.48
Cyclohexane	gal.	.77	110.00
85% (c.l.) (dms.)	gal.	—	.58
Cyclohexanone	lb.	.29	.31½
Diacetone, Pure (dlvd.)	lb.	.15½	.17
Dichlorethyl Ether (dms.)	lb.	.15½	.16½
Dichloropentanes (t.c.l.) (dms.)	lb.	—	.06
Dicon*	gal.	—	.55
Halowax Oil*	lb.	.28	.41
Heptanes* (t.c.)	gal.	.19	.22
Hexanes (t.c.)	gal.	.19	.22
Isopropyl Alcohol, Ref. 99% (dlvd.)	gal.	.62	.72
Ether, Ref. (dlvd.)	lb.	.09½	.11
Mersol*	gal.	.43	.75
Mesityl Oxide (dlvd.)	lb.	.15	.16½
Methyl Acetone, Syn. (dms., dlvd.)	gal.	.66	.72
Methyl Chloride	lb.	—	.12¾
Methyl Ethyl Ketone	lb.	.15	.16½
Methyl Isobutyl Ketone (dlvd.)	lb.	.17	.18½
Methylene Chloride	lb.	—	.12½
N-5 Pentane Mix* (t.c.)	gal.	—	.13½
N-6 Hexanes* (t.c.)	gal.	—	.14½
N-7 Hexanes* (t.c.)	gal.	—	.13½
Penetrell*	gal.	.42	.63
Perchlorethylene	lb.	—	.11
Petrolene* (t.c.)	gal.	—	.14125
Picolines, Alpha, Refined	lb.	.43½	.44
Mixed	lb.	.32½	.33
Proprietary Solvent (dms.)	gal.	.66	.77
Propyl Acetate (t.c., dlvd.)	lb.	—	.11¾
Alcohol (t.c., dlvd.)	lb.	—	.11
Pyridine, Refined	lb.	.74½	.75
Quinoline	lb.	.50	.54¼
Rubber Solvent (t.c.)	gal.	—	.16
Rubcol (t.c.)	gal.	—	.12875
Skellysolve B (Hexanes)* (t.c.)	gal.	—	.158
C (Heptanes)* (t.c.)	gal.	—	.151
R (Rubber Solvent)*	gal.	—	1.29

SOLVENTS (Cont'd)

Solvent, Crude, Light	gal.	.19	.28
Solvesso 100* (t.c.)	gal.	.33	.35
150 (t.c.)	gal.	.33	—
Sunny South DD Dipentine*	gal.	.42	.63
Sunny South DD Pine Oil*	lb.	—	.15
Sunray*	gal.	.1140	.1600
Toluene (dms.)	gal.	—	.38
Toluol (t.c.)	gal.	.33	.35
Trichlorethane	lb.	—	.12¾
Triglycol Dichloride	lb.	.63	.64
Union Thinner 1* (t.c.)	gal.	—	.174
5* (dms.)	gal.	—	.199
7* (t.c.)	gal.	—	.164
2-50 W Hi-Flash*	gal.	—	.41
Xylol	gal.	.34	.38

STABILIZING AGENTS (for Vinyl Resins)

Advastab BC-12*	lb.	.90	.95
BC-74*	lb.	.70	.75
BC-105*	lb.	.75	.80
CH-101*	lb.	.60	.65
CH-201*	lb.	.60	.65
E-82*	lb.	.90	.95
JCX*	lb.	.62	.67
L Paste*	lb.	.65	.70
SN*	lb.	.47	.52
T-10*	lb.	1.90	1.95
T-50-LT*	lb.	3.20	3.25
XBZ-155*	lb.	.69	.74
XC-143*	lb.	.90	.95
XE-98*	lb.	.53	.58
Barca 10*	lb.	.75	.80
Barium Ricinoleate (BVS)	lb.	—	.70
Barium Stearate	lb.	.41	.46
Basic Silicate White Lead	lb.	.16	.17
Cadmium Ricinoleate	lb.	—	2.00
Calcium Ricinoleate	lb.	—	.55
Dutch Boy DS-207*	lb.	—	.54
Plumb-O-Sil A*	lb.	—	.29¾
B*	lb.	—	.31¾
Tribase*	lb.	—	.26½
Dythal*	lb.	—	.39½
Ferro 182* (dms.)	lb.	.70	.76
200* (dms.)	lb.	1.33	1.43
203* (dms.)	lb.	.87	.91
541* (dms.)	lb.	.35½	.45½
541A* (dms.)	lb.	.82	.86
700* (dms.)	lb.	.48¾	.58¾
900* (dms.)	lb.	.90	.94
903* (dms.)	lb.	.60	.64
909* (dms.)	lb.	.91	.95
920*	lb.	—	.98
931* (dms.)	lb.	.75¾	.85¾
993* (dms.)	lb.	.89	.99
1203* (dms.)	lb.	1.30	1.40
1206* (dms.)	lb.	1.32	1.36
1820* (dms.)	lb.	.90	.94
1825* (dms.)	lb.	1.00	1.04
1976*	lb.	.47	.51
Harshaw 1-V-3*	lb.	.43	.45
1-V-4*	lb.	.66½	.70
1-V-7*	lb.	.70	.72
2-V-4*	lb.	.85	.87
2-V-7*	lb.	—	1.10
2-V-8*	lb.	—	1.30
5-V-1*	lb.	.41	.43
7-V-1*	lb.	—	.90
8-V-1*	lb.	.88	.90
8-V-5*	lb.	—	.80
8-V-100*	lb.	.82	.84
9-V-1*	lb.	.70	.72
12-V-5*	lb.	73	.75
24-V-1*	lb.	1.10	1.12
28-V-2*	lb.	—	1.18
128-V-5*	lb.	.86	.88
Lithium Stearate	lb.	.52	.57
Fluffy	lb.	.47½	.70
Standard	lb.	.52½	.75
Mark A*	lb.	2.80	3.15
C*	lb.	.81	.84
F*	lb.	.72	.75
GS*	lb.	.77	.80
M*	lb.	.59	.62
PL*	lb.	.62	.65
TT*	lb.	.72	.75
WS*	lb.	.97	1.00
X*	lb.	2.50	2.75
XI*	lb.	.87	.90
XV*	lb.	.84	.87
XX*	lb.	.57	.60
Metasap 613-A*	lb.	—	.69
613-B*	lb.	—	.84
613-C*	lb.	—	1.06
621*	lb.	—	.88
624*	lb.	—	.75
633*	lb.	—	.75
635*	lb.	—	.45
Modicol N*	lb.	.42½	.44½
S*	lb.	.30¾	.32½
Sodium Silicates 41°/1:32	cwt.	1.20	2.30
Stabelan E*	lb.	1.40	1.50
XL*	lb.	.55	.65
HR-50*	lb.	.75	.90
HR Liquid*	lb.	.65	.75
HR Paste*	lb.	.85	.95
HR Powder*	lb.	.95	1.05
No. 110 Liquid	lb.	.65	.75

STABILIZING AGENTS (Cont'd)

Istabelan			
No. 115 Liquid	lb.	.85	.95
No. 120 Liquid	lb.	.65	.75
Stabilizer No. 52*	lb.	1.90	2.00
89X*	lb.	.75	.80
B-5*	lb.	—	.70
E6B*	lb.	—	.95
G-1*	lb.	1.25	1.40
HR*	lb.	.85	.89
L*	lb.	—	.60
OM-10*	lb.	—	1.95
Staflex OY*	lb.	1.00	1.20
QXMA*	lb.	—	.70
Stayrite 10*	lb.	.36	.41
P-10*	lb.	.43	.45
15*	lb.	.55	.57
20*	lb.	.41	.46
22*	lb.	1.00	1.13
25*	lb.	.35	.40
70*	lb.	.70	.72
71*	lb.	.90	.92
75*	lb.	.61	.63
76*	lb.	.53	.55
80*	lb.	.70	.72
90*	lb.	.70	.72
95*	lb.	.70	.73
229*	lb.	.61	.63
Vanstay A* (dms.)	lb.	.50	.53
AB* (dms.)	lb.	.46	.49
CE* (dms.)	lb.	.44	.47
HT* (dms.)	lb.	.87	.90
HTA* (dms.)	lb.	.97	1.00
HTB* (dms.)	lb.	.70	.73
HTC* (dms.)	lb.	1.09	1.12
L* (dms.)	lb.	.32	.35
R* (dms.)	lb.	.67	.70
RZ-25* (dms.)	lb.	.65	.69
S* (dms.)	lb.	.57	.60
SA* (dms.)	lb.	.81	.84
W* (dms.)	lb.	1.22	1.25
X* (dms.)	lb.	.67	.70
Z* (dms.)	lb.	.62	.65

STIFFENING AGENTS

Polyac*	lb.	—	1.85
Processing Stiffener 710*	lb.	—	.88
Solvitose HDF, H. C-S. T, and E*	lb.	.22	.25
Versatil Gum 8-E*	lb.	.15	.19

SUN CHECKING AGENTS

Allied AA-1144*	lb.	.23	.24
AA-1177*	lb.	.15½	.16½
Antisol*	lb.	—	.23
Antisun* (Chipped)	lb.	.15½	.17½
(Slabbed)	lb.	.15	.17
Heliozone*	lb.	.31	.32
Microflake*	lb.	.20	.24
Nacconol NRSF*	lb.	.40½	.45
NBC*	lb.	—	1.67
Ross Sunproofing Waxes*	lb	—	.15
Sunolite*	lb.	.16	.22
127*	lb.	.16½	.20½
154*	lb.	.23	.25
Sunproof*	lb.	.31	.32
713*	lb.	.25	.26
Improved*	lb.	.25	.26
Super*	lb.	.40	.41
Jr.*	lb.	.20	.21
Tonox*	lb.	.52	.54

SURFACE ACTIVE AGENTS

Anhydrapent*	lb.	.56	.59
Anhydrol 6990*	lb.	.51	.56
6991*	lb.	.51	.56
Aquarex D*	lb.	—	.78
G*	lb.	—	.21
MDL*	lb.	—	.33
ME*	lb.	—	.80
NS*	lb.	—	.60
SMO*	lb.	—	.50
WAQ*	lb.	—	.20
Emulphor EL-620*	lb.	—	.40
EL-719*	lb.	—	.58
ON-870*	lb.	—	.55
Hyonics*	lb.	—	.28¾
Igepal CA-630	lb.	—	.29
CO-630	lb.	—	.29
CO-730	lb.	—	.29
CO-850*	lb.	—	.29
CO-880*	lb.	—	.29
Igepon CN-42*	lb.	—	.25
T-33*	lb.	—	.21
T-51*	lb.	—	.13½
T-77*	lb.	—	.49
Kessco 50201*	lb.	—	.44½
50203*	lb.	—	.44¼
18201*	lb.	—	.32
18203*	lb.	—	.35½
Lipal 9-N.* 11-0*	lb.	.28	.29
8-0,* 6-0*	lb.	.29	.30
25C,* 52C*	lb.	.34	.35
15T*	lb.	.23	.24
Pluronic L62*	lb.	.33½	.39
L64*	lb.	.33½	.39
Sellogen Gel*	lb.	—	.12¼
Soybean Lecithin	lb.	.13	.17
Synatol AV-60*	lb.	.28	.29

TACKIFIERS

Amalgamator Z-4*	lb.	.34	.35
Arceo 620-32B*	lb.	.20½	.21½
716-30*	lb.	.18½	.19½
1041-21*	lb.	.16½	.17½

TACKIFIERS (Cont'd)

Arcco A-26*	lb.	.18	.19
Bunaweld Polymer No. 780*	lb.	—	.24
No. 5514*	lb.	—	.35
Galex* (dms.)	lb.	.16	.18¾
Indopol H-300*	gal.	1.00	1.22
Koresin*	lb.	—	.95
Liquid Rubber Flux*	lb.	—	.14
Nacconal NRSF* (dlvd.)	lb.	.40½	.45
Nilox Resin* (c.l.)	cwt.	—	16.00
PR-162 Resin Emulsion (dms.)	lb.	.82	—
Resin V	lb.	—	.23½
Synthol*	lb.	.17	.24¾
Vistac A*	lb.	.21½	.22¾
Vistanex LM Grades*	lb.	—	.45
Zirex* (c.l.)	cwt.	—	15.25

THICKENERS (For Latex)

Alcogum AN-6*	lb.	.05½	.06
AN-10*	lb.	.09	.10
AN-25*	lb.	—	.31
PA-15*	lb.	—	.16
Betanol* (dms.)	lb.	.70	.95
Gomme Labolene*	lb.	.45	.47
Good-rite K-702*	lb.	.28½	.37
K-704*	lb.	.21	.22
K-705*	lb.	.30	.39
K-707*	lb.	.18	.19
K-708*	lb.	.28	.37
K-710*	lb.	.15	.16
Hycryl A-1000* (c.l.)	lb.	.090	.100
A-2000* (c.l.)	lb.	.335	.360
Modicol VD*	lb.	.13¾	.14¾
VE*	lb.	.13¾	.14¾
Polyco 296 BT*	lb.	.15	.16
296-N*	lb.	.15	.16
530*	lb.	.15	.16
Propylene Laurate (dms.)	lb.	.57	.82
Sodium Silicate, 41°/1:3.2	cwt.	1.20	2.30
Solvitose Series*	lb.	.22	.25

VULCANIZING AGENTS

Peroxide

UC XK-1960*	lb.	5.50	—

Selenium

Vandex*	lb.	—	7.00
VA-7*	lb.	—	.50

Sulfur

Blackbird* (c.l.)	cwt.	—	2.85
Cloud* (c.l.)	cwt.	—	2.80
Crystex*	lb.	.19½	.23
Darex Dispersed Sulfur*	lb.	.14	.16
Devil A* (c.l.)	cwt.	—	2.40

VULCANIZING AGENTS (Cont'd)

Dispersed Sulfur	lb.	.14	.15
Insoluble Sulfur 60*	lb.	.12½	.13
Ko-Blend IS*	lb.	—	.39
Mist* (Wettable) (c.l.)	cwt.	—	4.00
Spider* (c.l.)	cwt.	—	2.80
Star* (c.l.)	cwt.	—	3.25
Sulfasan R*	lb.	1.55	1.57
Tire* (c.l.)	cwt.	—	2.55
Tube*)c.l.)	cwt.	—	4.40
Vultac 2*	lb.	.47	.49
3*	lb.	.51	.53

Tellurium

Telloy*	lb.	—	2.65

WETTING AGENTS

Advawet No. 10*	lb.	—	.17
No. 33*	lb.	—	.48
Aerosol 18*	lb.	.37	.42
AY*	lb.	.75	.80
MA 80%*	lb.	.40	.45
OT 75% Aqueous*	lb.	.40	.45
OT 100%*	lb.	.75	.80
OT-B*	lb.	.65	.70
Alrosol* (dms.)	lb.	.35	.41
Alrosperse*	lb.	—	.18
Anhydrol 6990* and 6991*	lb.	.51	.56
Arenkap 50*	lb.	.30	.32
Dry 100*	lb.	.60	.64
Areket Dry 300*	lb.	.60	.64
Areskiene 375*	lb.	.42	.47
Armacs*	lb.	.28	.77
Arquads*	lb.	.42	.61
Emcol 5100* (dms.)	lb.	—	.31
Energetic W-100	lb.	.28½	.35
Etho-Chemicals*	lb.	.26	.58
Ethomeen S/15*	lb.	.48	.50
T/15*	lb.	.46	.48
Kessco E-122* (dms.)	lb.	—	.45
18201*	lb.	—	.32
Kreelon 4D* (dms.)	lb.	.13	.16
8G* (dms.)	lb.	.26	.28
Kyro EO* (dms.)	lb.	—	.29¼
Modicol N*	lb.	.42½	.44½
S*	lb.	.30¼	.32⅞
Nacconol SL* (dlvd.)	lb.	.084	.10
60S* (dlvd.)	lb.	.19	.225
Nacconol A* (dlvd.)	lb.	—	.52
Nekal WS-25	lb.	—	.38
WS-99	lb.	—	.95
Orvus AB Granules*	lb.	.16¼	.17¾
Parnol*	lb.	—	.13½
Regal Beads	lb.	.12¾	.16¾
H. D. Beads	lb.	.12¾	.15¾
Santomerse No. 3	lb.	.41	.45
S*	lb.	1.55	1.85

WETTING AGENTS (Cont'd)

Sorapon SF-73*	lb.	—	.18
SF-78*	lb.	—	.30
Sorbit P*	lb.	—	.28
Soybean Lecithin	lb.	.13	.17
Stablex G*	lb.	.50	.90
Tergitol 4* (dms., dlvd.)	lb.	.36½	.37½
7* (dms., dlvd.)	lb.	.43½	.44½
O8* (dms., dlvd.)	lb.	.36½	.37½
P28* (dms., dlvd.)	lb.	.18½	.19
Trenamine W-30	lb.	—	.13
Vultamol*	lb.	—	.17½
Wetsit Conc.*	lb.	.35	.35

MISCELLANEOUS CHEMICALS

Aquasperse 30*	lb.	—	.11
Arecopel W-18*	lb.	.17	.19
Black-Out Black, Clear & White	gal.	4.50	8.00
Chiplac Plaint	gal.	1.15	5.00
Copper Inhibitor No. 65*	lb.	—	1.57
D-Tac*	lb.	—	.22
2-Ethyl Hexanol	lb.	.23¼	.24¼
Fura-Tone Resin 1226*	lb.	.41	.43
MODX*	lb.	.38	.40
Nacconates* (dms.)	lb.	.99	3.53
Para Resins*	lb.	.04	.04½
Pigmented Filmite* (dlvd.)	lb.	.16¼	—
Resorcin, Tech.	lb.	.77½	.81½
Rio Resin*	lb.	.70	.72
Rongalite CX*	lb.	—	.21¾
Sherosopes*	lb.	.13½	.18¾
Sublac Resin PX-5*	lb.	.23½	.24½
Synpep*	lb.	.54	.60
Thiokol LP-205*	lb.	—	4.00
Tysonite*	lb.	.30	.30¾
Vanfre*	gal.	2.45	3.00
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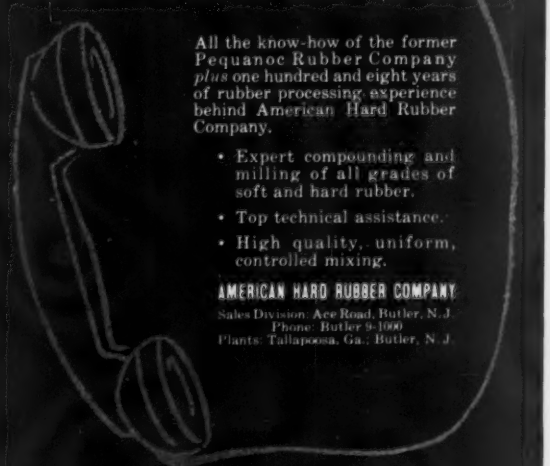

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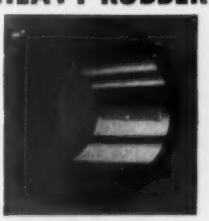

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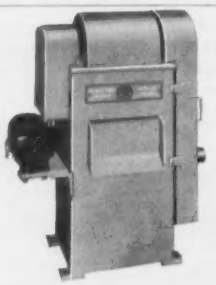

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